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On A Budget!



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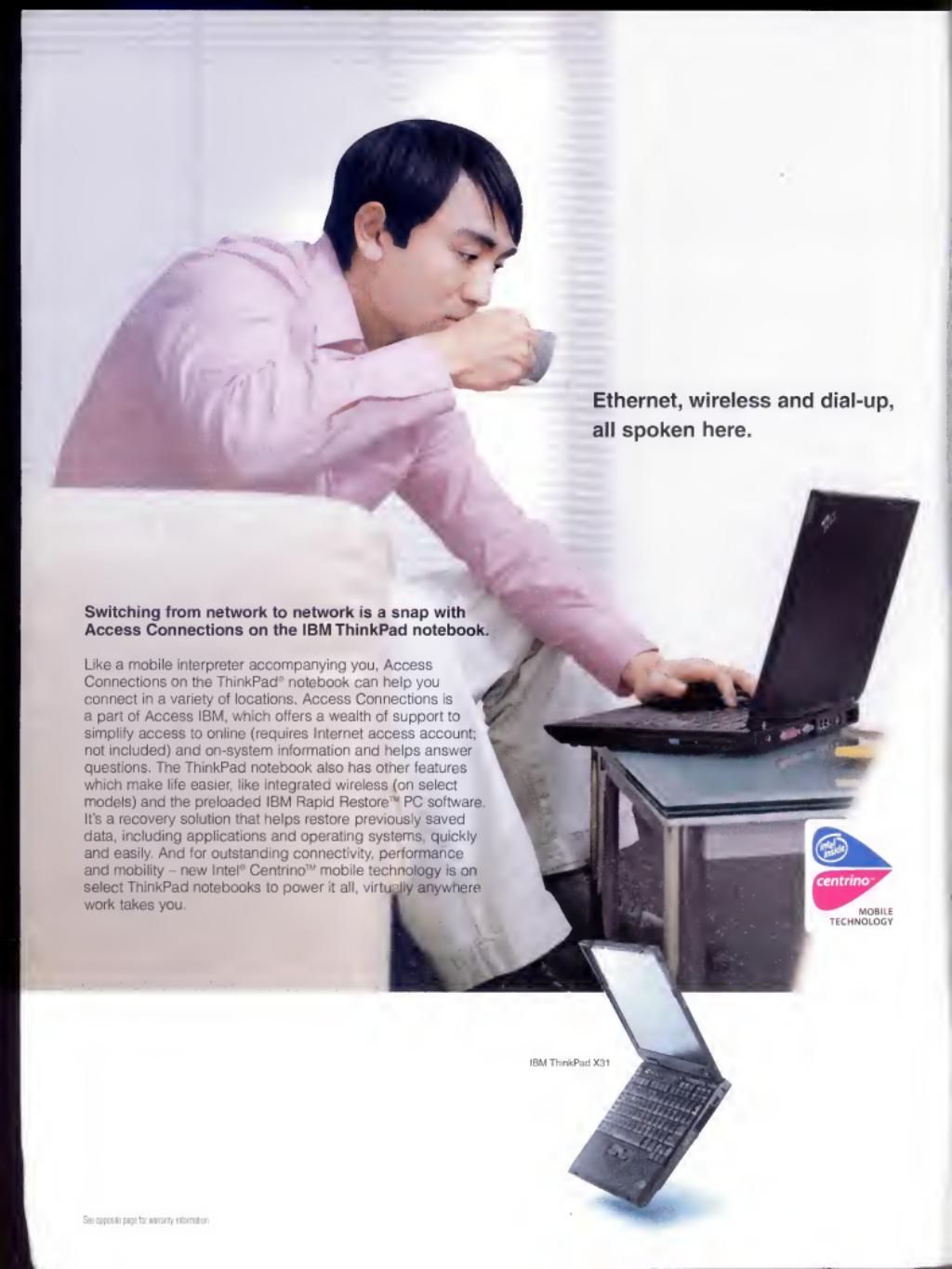
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On The • Broderbund Family Lawyer 2003
WEB • Ulead Video Studio 7



A black and white photograph of a man with dark hair, wearing a long-sleeved pink button-down shirt, leaning over a desk and working on a dark-colored IBM ThinkPad X31 laptop. He is resting his chin on his hand while looking down at the screen. The desk appears to be made of wood and has some papers or tools on it.

Ethernet, wireless and dial-up,
all spoken here.

**Switching from network to network is a snap with
Access Connections on the IBM ThinkPad notebook.**

Like a mobile interpreter accompanying you, Access Connections on the ThinkPad® notebook can help you connect in a variety of locations. Access Connections is a part of Access IBM, which offers a wealth of support to simplify access to online (requires Internet access account; not included) and on-system information and helps answer questions. The ThinkPad notebook also has other features which make life easier, like integrated wireless (on select models) and the preloaded IBM Rapid Restore™ PC software. It's a recovery solution that helps restore previously saved data, including applications and operating systems, quickly and easily. And for outstanding connectivity, performance and mobility – new Intel® Centrino™ mobile technology is on select ThinkPad notebooks to power it all, virtually anywhere work takes you.

IBM ThinkPad X31



Focus On: Repair & Upgrade Your PC

50 System Overhaul

Prices for new, ready-made computers have fallen dramatically in the last couple years, but a new PC is still a hefty investment. If you'd rather upgrade, keep reading. We'll show you which components you can readily upgrade and which you're better off buying new.

52 Hardly Difficult

If you find your supposedly cavernous hard drive is becoming full, now's the time to invest in a new drive, or you may want to install a second drive. We can give you pointers on how to do either.

56 Don't Forget The Memory

If your PC's been a little sluggish lately, make sure you take a look at its RAM. RAM is cheap and plentiful these days, so you might want to consider a memory upgrade.

58 Improve Your PC's Reading & Writing Skills

Optical drives, such as CD-ROM drives, are standard equipment on most PCs these days. And if you don't already have a DVD drive or a CD-RW (CD-rewritable) drive, you might want to consider adding one or both to your PC.

60 The Brains Of The Operation

As you hear about faster and faster CPUs, it may be tempting to run out and buy the latest, greatest processor. Before you do, however, you should know all processors and motherboards are not compatible. We'll tell you how to make a perfect fit.

64 Disappointing Sights & Sounds?

Upgrading your sound and graphic cards can be a relatively inexpensive investment that will yield huge rewards of rich sound and color.

67 Fire Your Printer

There's nothing better than a trusty old inkjet that chugs along at 4ppm (pages per minute), unless it's a shiny new printer that prints your digital pictures in vivid color.

68 When It's Your Turn To Take Care Of Mom

Your motherboard is the foundation of your system, and although there are few repairs you can make, there are a few things you can do to improve performance.

70 Core Curriculum

If your OS (operating system) is humming perfectly, you probably don't need to update or upgrade it, but if you're looking for a change, we'll give you a few options.

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Our *Smart Computing* columnists spent some quality time with computer and computer-related hardware to get beyond the benchmark scores, statistics, and marketing hype. Find out what they liked and disliked about their choices inside.

18 Lights, Camera, Media

Media players are becoming more and more handy. Some of today's players let you tune in to streaming audio and video over the Internet or just listen to a CD on your PC. This month, we examine some of the most popular media players available.

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Each month, we take a look at several useful gadgets and programs you can get for \$20 or less.



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In the past month, Microsoft has released three new WinXP updates, including two critical updates. We'll explain all three updates and introduce you to five handy WinXP tips.

28 Imaging Wizard



Windows Me's Scanner And Camera Wizard can simplify transferring images from a camera or scanner to your PC. However, the wizard isn't compatible with all imaging devices. We explore which hardware drivers work with the wizard and how to use this feature.

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30 Think Ink

If you're tired of buying expensive replacement inkjet cartridges for your inkjet printer, you might consider using



replacement cartridges from third-party vendors. We'll let you know how the cartridges from these third-party vendors fared when put to the test.

34 How Did They Do That? Wireless Networks

Wireless networking is becoming increasingly popular. On the one hand, we're starting to take wireless technology for granted, but does anyone really know how wireless technology works? We examine the details behind wireless networking.

36 Image File Frenzy

The computing world is full of acronyms for everything from interfaces to file extensions. Image file formats add to the list of acronyms with such formats as JPEG, GIF, and TIFF. We'll help you solve the mystery of image file formats.

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If traveling for your business just isn't economical, you might consider setting up videoconferencing equipment. We can show you what you need to get started.



42 Dig For Your Roots

You probably won't be able to chart your entire family history doing research on the Internet, but Genealogy.com is a resource-intensive place to start.

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74 Clean It Out With Soap

Sascha Segan's keyboard was gunky and full of cat hair. Rather than buy a new one (it wasn't broken, after all), he disassembled and cleaned his keyboard, and he'll tell you how.



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When you subscribe to *Smart Computing*, you receive much more than just a magazine. Head to the SmartComputing.com Web site and start taking advantage of everything that's waiting for you.

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92 Anatomy Of A Computer

It's time to get to know your computer. If you're afraid to crack open the case and poke around the tangled wires, take a look inside our computer instead.

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94 Defensive Computing

Computer expert and resident paranoid Alan Luber helps you avoid PC disasters.

95 Crashing? Try Cooling

Heat is your computer's worst enemy. We explain the problem and provide some advice on coping with overheated PCs.

98 Examining Errors

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Editor's Note

We've now been worried about our "throwaway society" for over 40 years. In "The Waste Makers" (1960) Vance Packard coined the term "planned obsolescence" and decried the wasteful (as he saw it) consumerism that had taken root in America.

It may be hard to believe now, but at the time, Packard was in the minority. Other respected voices had pretty much bought into the idea of planned obsolescence. Industrial designer J. Gordon Lipincott later became a critic of wasteful spending, but at the time he said, "Any method that can motivate the flow of merchandise to new buyers will create jobs and work for industry, and hence national prosperity."

Now though, many of us try to heed the lessons taught by our Depression-era parents and grandparents: Don't spend more than you can afford. Buy quality goods and keep them in good repair. If something breaks, fix it, don't replace it. If you must replace it, then it probably wasn't a wise purchase in the first place. The fact that advertisers are good at convincing you that you need the latest products doesn't mean that they're correct.

Wise lessons, but hard to heed when it comes to computers. With computers, we're not simply buying something that has bigger fins or more chrome than last year's model; new generations of computers truly are more powerful than older ones. Your 1993 Buick can still get you to the grocery store just as quickly and comfortably as that newer model, but try editing video on your 1993 Compaq Presario. Although cars haven't changed much since the 1950s, improvements in computer technology tend to be real, rapid, and substantive.

Still, if your old computer is doing what you need it to do, why spend money on a new one? Why not try to get the most out of your computer for as long as you can? To do that, though, you need to be able to maintain your system and make the minor upgrades that will help you get your work (or play) accomplished. That's where this "Repair & Upgrade" issue of *Smart Computing* comes in. Follow along as we tell you how to keep your computer up to date and up to snuff.



ROD SCHER, PUBLICATION EDITOR

Now Available On Newsstands . . .

Computer Power User • 3 Power-Packed PCs

Featured this month are three power-packed computers that could blow your mind. However, you will also learn about your PC's vulnerabilities, the best power protection to avoid a system burnout or data loss, and the video editor that will best fit your needs.

Learning Series • Using Windows XP (Special Reprint)

Back by popular demand, the *Smart Computing Learning Series' Using Windows XP* issue will show you everything you need to know about getting started and getting around in Microsoft's latest operating system. We've updated every article and added some new content here and there; this issue quickly sold out the first time around, so don't miss out.

Reference Series • Windows A-Z

This huge issue is full of tips and tutorials for all of the most popular versions of Windows, including 3.x/95/98/Me/NT/2000 and XP. You'll find installation help, troubleshooting advice, and step-by-step articles that show you how to get the most from your operating system.

Corrections/Clarifications

In our April "Windows Tweaks" issue (pg. 59) we said that readers could change how folders display lists of files by double-clicking My Computer, the C: drive, and then selecting View and Folder Options. Folder Options is in the Tools menu, not the View menu.

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The Next Big Thing In CPUs

Every so often, a significant technological shift occurs in the computer world. Older technologies, once hailed as highly efficient and worthwhile, fade from view as newer ones, promising better, faster, and more robust performance, take their place. Some advances require that you notice them. For example, when the IEEE 1394 (FireWire) standard for high-speed data transmission became available, you had to install a FireWire expansion card and buy new FireWire devices to

take advantage of the technology. But some technological advances filter into the computing scene without much notice from average PC users.

Here's a case in point: By the time you read this, microprocessor manufacturer AMD (Advanced Micro Devices) will have unveiled its new family of Opteron (code-named Hammer) processors, which computer geeks have long anticipated as the next big thing in CPUs. You might not realize it, but right now,

most, if not all, of your programs use 32-bit technology. This means that your computer's CPU crunches the numbers necessary for running your programs in 32-bit increments. In contrast, the Opteron uses 64-bit technology, which performs calculations in chunks of data twice the size.

Systems using Opteron processors will experience a performance increase in existing 32-bit, 16-bit, and 8-bit programs and will be able to run 64-bit programs as they become more readily available. Folks in the IT (information technology) industry will enjoy the initial benefits the Opteron provides. Many companies presently have an unruly mix of 32-bit and 64-bit servers, so the ability to change over to all-Opteron, all-64-bit computing will streamline their operations. Additionally, says Marty Seyer, AMD vice president of server businesses, this technology will soon exist both at home and in the workplace, thus making it easier to cart your work between home and office.

The first Opteron-based CPUs for the consumer market are scheduled to arrive in September. Dubbed Athlon 64, this family of 64-bit processors will start appearing in prebuilt systems worldwide at a price that's competitive with current 32-bit processors, Seyer says. There is widespread support for 64-bit computing from the software industry, says Seyer, and by the time 64-bit processors become pervasive, there will be plenty of video editing, graphics design, and other high-power software available, as well.

PC Sales On The Rise

Despite a widespread economic slump, both consumer and commercial PC sales are on the rise. A recent IDC (International Data Corp.) report reflected the 2001 slump followed by promising numbers for 2002 through 2004.

PC Buying Past, Present & Future

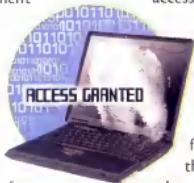
Here are the numbers for worldwide sales, in millions of units, from IDC. Figures for 2003 and 2004 are based on forecast data.



Fingerprint, Please

Every year, airport personnel find hundreds of notebook PCs that passengers have inadvertently left behind, and according to government audits, even the FBI and Drug Enforcement Agency have seen hundreds of notebooks lost or stolen in recent years. This might seem shocking considering the cost of these notebooks and the importance of their contents, but it's not terribly surprising given how small and lightweight notebooks have become.

Physical locks and phone-home software are becoming more prevalent, but biometric security devices from companies such as Synaptics are catching on with Samsung and other computer manufacturers.



Samsung's latest notebook, the Sens X10, includes Synaptics' FingerPrint TouchPad. Fingerprint touchpads to restrict login access are nothing new, but Synaptics' TouchPad works to decrypt files and store passwords, as well. This lets you put your finger on a pad rather than type a password

whenever you log into a notebook, access a secure Web site or network, or decrypt an encrypted file. TouchPad also includes a simple wizard that walks you through the setup process, so you don't need much security know-how to gain access to high-level security.

Your Keyboard Could Be Hazardous To Your Health

Over the years, folks have worried about the effect cell phones, computer monitors, and other radiation-producing devices have on their users' health. However, according to recent findings, it seems that we computer users should also pay attention to good old-fashioned germs. TechTV recently reported what happened after taking the keyboard from a multiuser computer (one that people use while drinking coffee and eating lunch and is positioned near a restroom) and sending it to the University of California at Berkeley School of Public Health for testing.

Microbiologists at the School of Public Health were reportedly surprised at the findings, which included many types of gram-positive bacteria, a family that includes staphylococcus. This bacteria is the source of staph infections and strep throat. Most American households are chock-full of antibacterial soaps and detergents, but it's probably just a matter of time before we start seeing such cleansers in electronics-friendly form for our computer equipment. For now, check out "Clean It Out With Soap," on page 74 for information about how you can disassemble and clean your keyboard.

REVIEW

Is Your Audio Convertible?

So you've used Windows Media Player or other software to rip (copy) music from audio CDs to your computer's hard drive, and now you want to know how to download those files to a portable MP3 player. Windows Media Player encodes music in the WMA (Windows Media Audio) format, and most standard MP3 players won't work with WMA files. All To MP3 Converter 1.1 lets you convert files from WMA to MP3 formats. It works with Windows 98/NT/2000/Me/XP and also lets you convert music files with .OGG (Ogg Vorbis), .WAV (standard Windows audio file), and other extensions.



When you first run the program, a setup window asks you to define settings such as bit rate (recording speed) and ID3 tagging (artist, title, and other track information) options. You can make adjustments or leave the default settings intact. As soon as you choose an output folder for converted music files, click OK and the program is ready to use. Right-click Start and click Explore to open Windows Explorer, locate the music file you want to convert, right-click it, and select Convert To MP3. You then have another chance to change settings before the conversion takes place, or you can simply click Start.

We tested All To MP3 Converter 1.1 on a PC with a 667MHz Pentium III processor and 192MB of RAM, running Windows XP Home Edition. In our tests, it took 40 seconds to convert a single 4 MB WMA file (a tune with a four-minute playback time) to an MP3 format. We found the program easy to use, and the results were solid. Our only beef is that the initial setup window requires that you use a screen resolution of 1,024 x 768 or higher; the window is too large to fit in an 800 x 600 screen.

All To MP3 Converter 1.1 is available for download either in a trial version or a permanent version costing \$19. The only difference between the two is the trial version expires after 14 days, so you can try out every bit of the program's functionality before you make a purchase decision.

All To MP3 Converter 1.1

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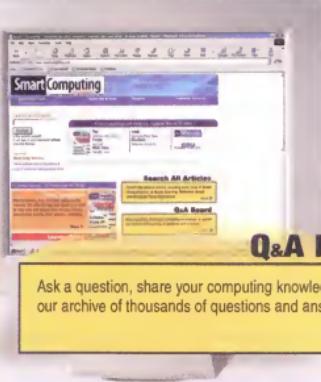
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Read All About It!

Publishing newspaper content in an online, browser-based format is nothing new. Traditional print newspapers have taken advantage of the Internet to maximize exposure, drum up new subscribers, and even increase revenues by selling Web space to advertisers. But the typical online newspaper, whether it's *The New York Times* or a small-town weekly, only includes top stories, columns, and departments. That's why we took notice when a big California paper, *The Orange County Register*, introduced a new kind of online newspaper.

At first glance, the OC Register Web site (<http://www.ocregister.com>) looks and functions like an ordinary online newspaper. But if you click the Online Edition link, you can subscribe to a completely revamped version of the OC Register site, complete with the content from every single page of the newspaper. That includes everything from front-page stories to back-page classifieds.

To bring everything to the Web, the new OC Register site uses a program called ActivePaper Daily from Olive Software, a company that wants to change the way publishers and readers think about online newspapers. The OC Register site is an early example of what ActivePaper Daily can do; Olive Software reports more than 80 newspapers and magazines



worldwide currently use the program, as well.

Giving you the ability to see every inch of a newspaper is only a small part of what ActivePaper Daily lets you do. OC Register online subscribers can, for example, quickly adjust article text to a readable size; open articles as PDF (Portable Document Format) files; email or print



articles, photos, ads, coupons, and even comic strips and crossword puzzles; or add them to a Web version of a personal scrapbook called My Collection. With My Collection, you can bookmark any item from the newspaper; it saves a link to the item, retains the headline for that item, and keeps it in a list for easy access whenever you're online.

For publications looking for a truly paper-free answer to getting their content online, OC Register provides a great lead.

REVIEW

Wonder Bar

There never seems to be a lack of new manufacturers hawking products that, if you believe the ad copy that accompanies them, are the best thing since sliced cheese. We know from experience that many (if not most) of these products aren't worth your time. That's why we're so delighted when we get our hands on a new gizmo that not only works as advertised but also is easy to use and performs better than we imagined it would. This time around the product is AZIO Technologies' MP-306, a combination MP3 player and USB (Universal Serial Bus) memory stick.

The lightweight, tiny (3.5-inch x 1-inch x 0.75-inch) MP-306 has a capacity of 128MB, but what you do with that capacity is entirely up to you. As a memory stick, the device works superbly. It works with Windows 98/98SE/Me/2000/XP and requires one AAA battery (included). As soon as you plug the device into a system running WinMe/2000/XP the PC detects it as an additional hard drive; Win98/98SE users must first install a driver (included on a mini CD). The MP-306 uses the USB 1.1 standard rather than the faster USB 2.0. In our tests, it took roughly 30 seconds to transfer a 500KB file from a PC to the MP-306, which works out to 16.6KBps (kilobytes per second).

We appreciated that the MP-306 works seamlessly with Windows Explorer and Microsoft's Windows Media Player, as well as other media players such as Musicmatch's Jukebox. It handles MP3 and WMA (Windows Media Audio) files, and the included bud-style headphones provide crisp, full-bodied sound (or, if you prefer to change the sound a bit, the MP-306 has an equalizer). One battery lasts about 12 hours. In addition to working as a standard MP3 player, you can also plug it into your computer and play music files stored on the stick through your PC's media player. The MP-306 has a built-in microphone for MP3 voice recording.

MP-306

\$99 • AZIO Technologies
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<http://www.azio-tech.com>

Duly Quoted

"Google's a very nice system, but compared to my vision, it's pathetic."

—Jim Allchin, group vice president of platforms at Microsoft, commenting on a search tool that will come with the next version of Windows (code-named Longhorn). Source: *The Seattle Times*

New Products

Compiled by Dana Montey

Quick takes on the latest hardware and software to hit the market at press time. Manufacturers' and publishers' release dates are subject to change, so some of the products may not be available when you read this.

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<http://www.belkin.com>

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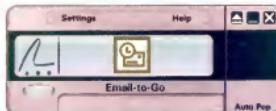
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Send your comments to
joshua@smartcomputing.com

Networking For Newbies

Buy A Networking Kit To Avoid Confusion

You have three desktop computers and one notebook. You want to build a home network in which two of the desktops connect via blazing fast Ethernet cables and the other two computers connect wirelessly. You also want every computer on the network to connect to the Internet through your single cable modem. Two of your computers run Windows 98, one runs Windows Me, and another runs Windows XP. Are you trembling yet?

Finding and assembling the appropriate devices for a wired and wireless network can be tricky, especially if you plan to share an Internet connection. Deciding which components you need is half the headache, so I was glad to see Microsoft's new Broadband Networking Wireless Desktop Kit. The packaging promised the other half of the headache, setup, would take only minutes.

The Pieces Of The Puzzle

The Wireless Desktop Kit contains almost everything you need to share Internet access between two computers. The kit's most important component is the base station, which combines a router, a four-port switch, and a wireless access point. As a router, the base station distributes from the Internet and network to the appropriate computers. As an access point, it transfers data between other wireless devices. The Ethernet switch transfers data between wired computers. You'll need to attach the base station to your broadband connection and one of the computers using the PC's Ethernet port. If the PC doesn't have the port, you'll need to buy the Ethernet adapter separately. Keep in mind that if you already have a cable modem, your PC probably has an Ethernet port.

The kit's other component is the Wireless USB (Universal Serial Bus) Adapter, which lets your PC

transfer data to (and receive data from) the base station wirelessly. Both devices use the popular IEEE 802.11b wireless networking standard, also known as Wi-Fi. You can connect additional computers to the network, either by using Ethernet cables or additional wireless adapters. To connect a notebook computer wirelessly, you can buy a Wireless Notebook Adapter for \$84.95. Additional Wireless USB Adapters are also \$84.95 each.

Microsoft ships two manuals in the Wireless Desktop Kit box. If you are new to networking, read the User's Guide first to get better understanding of wireless and wired networking. The User's Guide is easy to understand and includes illustrations and a glossary of networking terms. If you know your way around networking, grab the Start Here manual and dive in.

Network 101

The Network Utility CD walks you through the configuration process step by step. I was glad to see that the dialog boxes use easy-to-understand language. When the Network Utility does use "techie" terms, it displays a Help icon. When a dialog box asked whether I had an Ethernet cable running from my cable modem to my computer, I clicked Help, which opened another window. The window described the Ethernet cable and displayed an illustration of a cable. The Network Utility is this clear during the entire configuration process.

During configuration, you can enable WEP (Wired Equivalent Privacy) 128-bit encryption. If you don't enable encryption, malicious users may be able to intercept your data as it flies from one wireless adapter to another. The Network Utility also lets you save your network settings to a floppy diskette, which you can use to configure the other computers on your network.

The Wireless Desktop Kit makes an excellent introduction to home networking. You can connect more than 200 devices to the base station (you'll need additional switches to connect more than four wired devices), and it's compatible with other networking devices. Microsoft offers 24/7 toll-free phone support. ■

Broadband Networking Wireless Desktop Kit



For More Information

Broadband Networking Wireless Desktop Kit

\$209

Microsoft

(888) 218-5617

(716) 871-2915

<http://www.microsoft.com/hardware/broadbandnetworking>

Send your comments to
cal@smartcomputing.com

A Big Computer For A Small Price

MPC's Millennia 910i Creative Studio Has What It Takes

If you've been looking for a reliable, midpriced desktop system, check out the latest offerings from MPC. MPC is the new name for MicronPC, which for years has delivered preconfigured and made-to-order desktop and notebook PCs for home, business, and government users. Recently, I spent a month with a pair of MPC's Millennia Creative Studio line of computers designed for home and SOHO (small office/home office) users: the 910a (a system built around an advanced Micro Devices Athlon processor) and the one I'm writing about here, the 910i (built around an Intel 2.8GHz Pentium 4 processor).

What's Under The Hood

It's funny how quickly computer components become yesterday's news in the industry. Only months ago, the 2.8GHz Pentium 4 was the fastest, most expensive Pentium CPU on the market. But today's best Pentium 4 is a 3.06GHz version. Because semiconductor companies continually roll out faster and better processors, consumers benefit because the older processors quickly drop in price. For instance, at press time, the 3.06GHz Pentium 4 cost \$589 while this system's 2.8GHz Pentium 4 costs \$375. That's just one reason the 910i configuration I reviewed costs hundreds of dollars less than similar systems with slightly more current parts.

The 910i has 512MB of PC2700 DDR SDRAM (double-data-rate synchronous dynamic RAM), which is plenty of memory for ordinary home and SOHO tasks, as well as more memory-intensive tasks, such as video editing. Although the type of memory, PC2700 (which indicates it can process data at a rate of 2.7GBps [gigabytes per second]), is no longer cutting edge, it's still top-notch. For storage, the system includes a 120GB IBM hard drive and a 3.5-inch floppy diskette drive. The system has a speedy



Millennia 910i Creative Studio

48X/12X/48X CD-RW (CD-rewriteable) drive and a DVD-ROM drive.

A 19-inch CRT (cathode-ray tube) monitor is included in the system price. It delivers a sharp picture thanks to a 0.25mm dot pitch (the amount of space that exists between same-colored pixels; 0.30mm is decent, and lower numbers indicate a sharper picture). The 910i's video card is an NVIDIA GeForce4 Ti 4200 with 128MB of DDR video memory. This is, once again, an especially nice component that costs a little less because it's not the current top-of-the-line.

The 910i comes with a set of rich-sounding Altec Lansing 221 speakers (one subwoofer and two satellite speakers), a Microsoft Multimedia Keyboard, and a Microsoft IntelliMouse Optical. It also comes with fast Gigabit Ethernet, a modem, and a nice lineup of ports: one parallel, two serial, six USB (Universal Serial Bus) 2.0, and two IEEE 1394 (better known as FireWire). It runs Windows XP Home Edition and a software bundle that includes Microsoft's Works Suite 2002.

How It Rates

Our lab analysts ran the usual benchmarks on the 910i, and it performed exceptionally well for a system in its price range. It scored a very high 11,597 in 3DMark2001, which means that it will capably handle graphic design work, video editing, and 3D games. It also earned an overall 248 rating in SYSmark2002; this is better than the benchmark's base rating of 200 and indicates that the system will perform well in a variety of office and Internet applications.

Thumbs Up

I ran numerous applications and tested the system's multimedia capabilities, as well, by burning test CDs and watching portions of a movie on DVD. In all, I was extremely impressed with how smoothly the 910i handled every task. Check out MPC's Web site to see the ample assortment of component options for the 910i. Depending on what you want, this system can cost a little more than the price listed below or significantly less. ■

For More Information

Millennia 910i Creative Studio
\$1,690
MPC
(888) 224-4247
(208) 893-8970
<http://www.micronpc.com>

Tunes To Go

SONICblue's Rio S35S Vies To Be Your Favorite Workout Companion

Portable audio devices have certainly evolved over the years, going from portable audio cassette players and portable CD players to MP3 players. With an MP3 player, you save, or encode, your CD tracks to your computer and then transfer those tracks to the player.

SONICblue's Rio S35S is one of the smaller MP3 players I've seen. Measuring just 0.8 inches high x 2.5 inches wide x 2.75 inches deep, weighing 2.2 ounces, and containing no moving parts, the S35S is the perfect companion for anyone who leads a busy life.

Under The Hood

The S35S supports MP3 and WMA (Windows Media Audio) files and comes with 128MB of internal memory, which the company claims should hold roughly four hours of music. For more music, use the open memory card slot to upgrade to 640MB.

The S35S runs on a single alkaline or NiMH (nickel-metal hydride) rechargeable AAA battery. SONICblue states that a single AAA battery should last about 15 hours; however, during my testing, the battery only lasted about eight and a half hours. If you plan on using your player often, invest in some rechargeable batteries.

The S35S also comes with Rio Music Manager for transferring songs to the player, RealOne for encoding tracks, iTunes for encoding tracks on a Mac, and MoodLogic for organizing your collection and correcting track information such as track title. Other S35S features include a built-in FM tuner, a clock/stopwatch, a sport armband, sport headphones, and a protective plastic shell with belt clip.

MP3 Moments

For testing, I transferred 32 tracks (approximately two hours and 15 minutes) encoded in WMA format at 128Kbps (kilobits per second). This took approximately four and a half minutes and occupied 126MB,



Rio S35S

which equals a pretty speedy transfer rate of 0.47MBps (megabytes per second). To transfer my tunes, I used Rio Music Manager and found the software's interface clean and simple to use.

With some tunes on the player, I checked out the sound quality. First off, I wasn't thrilled with the design of the headphones; they wrap over your ears and don't fit securely. Although they look Secret Service-like cool, they aren't that cool to wear. And they don't offer very good sound quality. I plugged in some Sony headphones, and the player redeemed itself with much improved sound quality. I also tried each of the six preset Equalizer options, including Rock. Each option subtly adjusted the quality.

Next, I gave the FM tuner a whirl. Although reception quality wasn't very good, I was able to tune in one station; however, reception became fuzzy if I moved the player around too much. Of course, an MP3 player isn't designed to be a radio, so I'll forgive the fuzziness.

The S35S's rubberized texture gives the player a sturdy and durable feel, despite its small form factor. The player's ergonomic design fits comfortably in the palm of your hand, with the controls easy to navigate with one hand. When attached to the armband, the player is light and doesn't interfere with what you're doing.

The large round dial on the front of the player offers an intuitive four-way toggle selector, which is used to access menu options or control track playback. During playback, the backlit LCD (liquid-crystal display) shows information such as battery life and track title.

Time Well Spent

I enjoyed my time spent with the S35S; getting started was a piece of cake and the player's interface made navigating a breeze. But with only 128MB of internal memory, your song selection is limited. I recommend purchasing more memory, some rechargeable batteries, and different headphones. If this doesn't break your MP3 player budget, the S35S is the player for you. ■

For More Information

Rio S35S
\$179.99
SONICblue
(800) 468-5846
<http://www.sonicblue.com>

The Little Hard Drive That Could

The Archos Jukebox.
Cool But Confusing

The Archos Jukebox Multimedia 20 is a lot like an unruly little brother. No matter how frustrated you get with the darned thing's disruptive behavior, you can't help but love it. Who says you can't be devoted to a 1-pound, 20GB hard drive?

It's A What?

Archos calls the Jukebox a "handheld entertainment center," a moniker that's certainly apt for a hard drive adorned with a 1.5-inch color monitor, optional add-on devices, and a full panel of control buttons. Combined, these things will immediately cause you pain somewhere in your posterior because the Jukebox's printed and CD-based manuals cover only the bare necessities to get you up and running. Once you master the basics, you'll be figuring out this device on your own. Good luck, too, because the Jukebox's menus and controls are as bewildering as a cornfield maze after an October windstorm.

As you wander through these menus, you'll see that you can play MP3 music files and MPEG4 (Motion Picture Experts Group) video, view digital images, or just store whatever data you prefer for easy transport. Through the Line In port, you can also record sounds to the Jukebox for future playback.

The drive works with USB (Universal Serial Bus) 1.1, but with an optional cable, you can use much faster Hi-Speed USB 2.0 (\$30) or FireWire (\$70) connectivity. You can also splurge a bit for add-on modules that let you transfer data from a CompactFlash or SmartMedia card (\$60) or take photos with an attachable 1.3-megapixel camera (\$99).

It Really Does Work

Though the Jukebox's list of features is rather long, I did manage to use all of them during my tests. I transferred dozens of MP3 files to the drive



Jukebox
Multimedia 20

in just a few minutes, filed them in to a new directory, and played them back while I altered song titles and browsed my playlists, all without too much trouble.

Then I attached the CompactFlash card module to view pictures I took with my digital camera. This turned into an ordeal in a hurry because photos load at an exasperating rate of about four seconds each. I transferred the images from the card to the drive itself in the hopes that this would speed up image load times, but alas, there was no improvement. Browsing dozens of photos gets old in a hurry on the Jukebox, but it's still a convenient way to store photos when your flash cards fill up.

I had more fun connecting the Jukebox to my television to play songs and watch the included short video clips. The possibilities here are endless and intriguing and limited only by your imagination. Don't like the hotel's entertainment options? Just whip out your music collection or play a movie you recorded to the Jukebox from a DVD at home.

Worth The Frustration

Of course, few of these functions will work perfectly unless you're at least somewhat computer-savvy, and you'll have to use trial and error to master the product's quirks. Want to return to the main menu after viewing your photos? Press Off, of course—but push this button only for a moment lest you accidentally kill the power.

If you are headed out for a road trip, remember that you'll need about three hours to charge the drive's lithium-ion battery pack. The pack lasts for about eight hours of MP3 playback and, as with a digital camera, loses its charge fast if you use the monitor a lot.

In short, using the Jukebox requires patience and persistence, and novices might want to bypass this one altogether. But if you like the dizzying array of features packed into this small drive and don't mind anteing up cash for the optional modules, the Jukebox will serve you well, sort of like a kid brother you coerced into doing your chores. ■

For More Information

Jukebox Multimedia 20
\$340
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(949) 609-1400
<http://www.archos.com>



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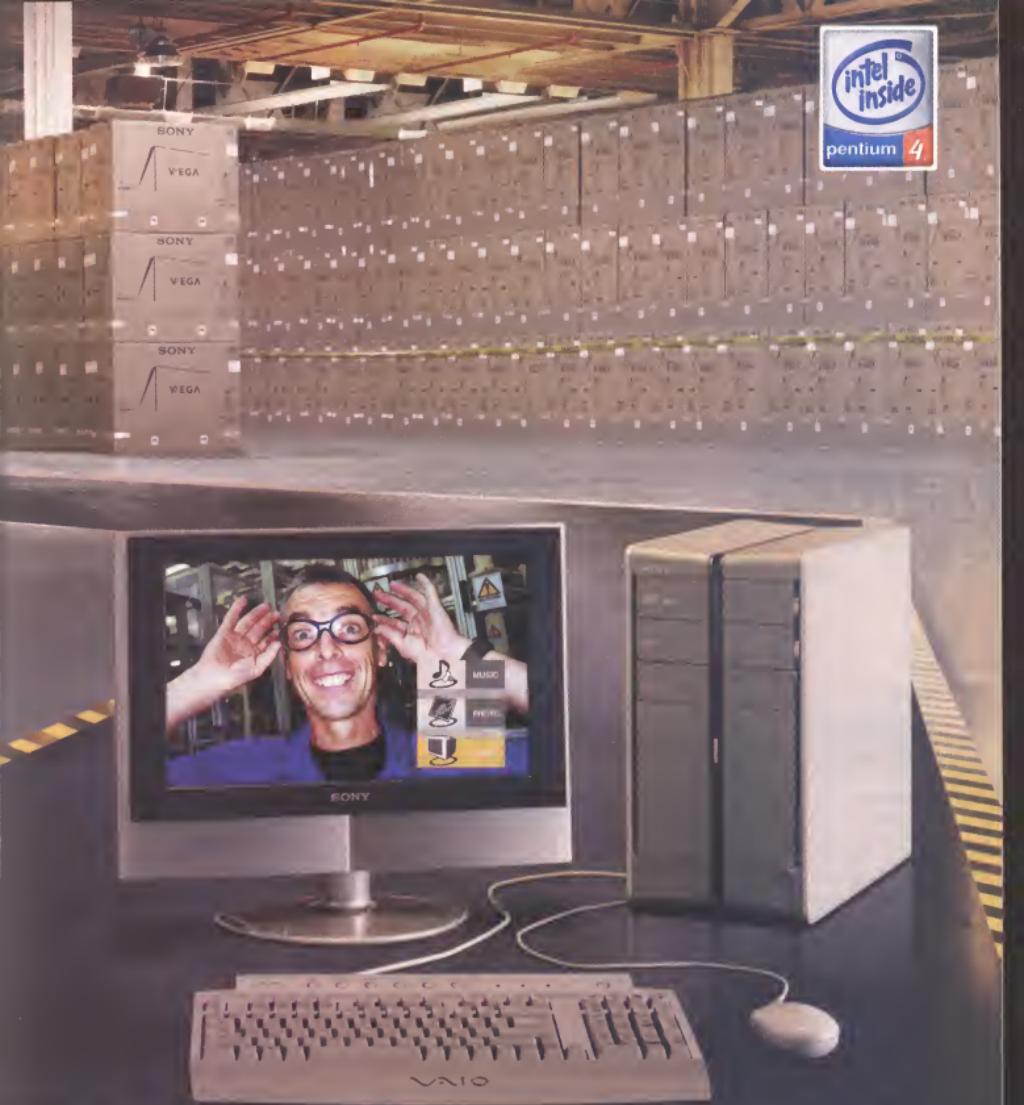


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We Explore The Latest In Media Players



June 2003 Smart Choice • RealOne Player 2.0

Although it seems like millennia in Internet years, it wasn't all that long ago that text dominated a largely silent Internet. Improvements in networking and compression technology have made it easier to access audio and video content online. Today we download copies of our favorite songs and watch news reports as they stream in over the Internet without so much as a second thought. Provided, that is, that we have the right media player for the job.

Media players have a tougher and tougher role to fulfill. In addition to playing the content on our hard drives, a media player should be able to access streaming audio and video content. As developers race to add new features, media players are starting to do more than just play back audio and video clips. Many top media players let us copy music from a CD (a process

called ripping) and even create our own CDs (if we have a CD-RW [CD-rewritable] drive installed). Media players are even helping us keep our digital media organized by filling in artist, album, and track information and then saving files in a clear and organized manner.

With the release of WMP (Windows Media Player) 9, it's time to re-examine media players for Windows. Is WMP 9 worth all the hype or do products from Apple and RealNetworks mount a significant challenge to WMP?

QuickTime 6

Apple

Basic (Free); Pro (\$29.99)
(800) 692-7753; (408) 996-1010
<http://www.apple.com/quicktime>

For Apple users, QuickTime is the equivalent of WMP. QuickTime comes preinstalled on Apple systems; however, on the Windows platform, QuickTime isn't nearly as essential, although it's still a fine media player.

Users can choose from QuickTime Basic and QuickTime Pro. The Basic version is free (it's what comes preinstalled on Apple desktops and notebooks), but it is more limited. Like RealOne Player and WMP, QuickTime includes a browser plug-in that lets you view QuickTime content directly within a Web page. This alone is reason for some Windows users to download and install QuickTime as many popular movie trailers are only available in QuickTime format (thanks, George Lucas). QuickTime Pro includes basic editing features and the ability to import and export a variety of file formats. For instance, QuickTime Pro can convert files into the newer MPEG-4 (Moving Picture Experts Group-4) format in order to reduce file size.

QuickTime isn't a great music player. Although QuickTime 6 can play MP3 and other music files, you cannot queue up files in a playlist like you can in RealOne Player or WMP. Obviously, Apple doesn't intend for QuickTime to directly compete with such digital jukeboxes as RealOne Player and WMP.

The What's On section of Apple's QuickTime Web site (<http://www.apple.com/quicktime/whatson>) includes numerous links to streaming QuickTime content. You'll find music videos and audio clips in the Music section. If seeing the previews is your favorite part of going to a movie, you'll definitely want to check out the Movie Trailers section. In the Game Trailers section, you will see previews of the latest video games. The News And Entertainment section



seems slightly more skewed toward the Entertainment side of things. Simply click a link to begin playing back streaming audio or video clips.

The free version of QuickTime can play a variety of content including Windows AVI (Audio-Video Interleaved) video files, MP3 files, and MPEG files. The latest release of QuickTime includes support for MPEG-4, which provides better, smoother video over lower-bandwidth connections. The new version also includes support for Dolby Laboratory's AAC (Advanced Audio Coding) audio format, which provides higher quality audio at smaller file sizes. QuickTime also supports image files such as BMP (bit mapped), PICT, and TIFF (Tagged Image File Format).

RealOne Player 2.0

RealNetworks

Free (RealOne Player); \$19.95 (RealOne PlayerPlus)

(800) 444-8011

<http://www.real.com>

RealNetworks introduced many of us to streaming audio way back in the early days of the Web. Since that time, RealNetworks has replaced its RealPlayer with a new RealOne Player that combines online services with all the features we've come to expect from the older RealPlayer and then some.

RealOne Player is wrapped in a slick, attractive interface that's straightforward and easy to use. The RealOne window is divided into three regions: a video window in the upper-left corner is placed next to an information window in the upper-right corner. Below both windows is a browser that provides additional information, and a toolbar at the very bottom lets you access specific RealOne features.

Unlike QuickTime, RealOne Player lets you queue up content in a playlist.

It can support a variety of popular file formats including audio CDs, MP3, MPEG-4, DVD, AVI, and WMA (Windows Media Audio). The My Library button on the bottom toolbar lets you pick through your media files in a nicely organized format. You can search for audio files by album, artist, or genre.

The CD button along the bottom toolbar provides access to audio CDs. You can simply listen to your favorite CD, rip music from your CD to your hard drive, or create an entirely new audio CD. The ability to copy and burn CDs is a nice extra that places RealOne Player on a par with Microsoft WMP. By default, RealOne Player saves music in a proprietary RealAudio 8 format, but you can opt to save audio in MP3 or uncompressed WAV format. By default, RealOne Player has a maximum bit rate (number of samples per second; the higher the bit rate, the better the sound, but



the larger the file size) of just 96Kbps (kilobits per second) for MP3 files. 128Kbps is generally considered the best balance between sound quality and file size. RealNetworks, however, offers a free plug-in to expand MP3 encoding capability to as much as 320Kbps. WMP doesn't provide any MP3 encoder, instead letting users install third-party MP3 encoders that cost roughly \$10.

You'll also find a Device button in the bottom toolbar. This feature lets you transfer music from your PC to a mobile music player. Again, WMP offers a similar feature.

You access streaming content using the Channels and Radio buttons on the bottom toolbar. The Channels button provides access to streaming video clips, while the Radio button provides access to streaming audio. If you find content you like, you can mark it as a preset so you can find it quickly when you return. It is important to note that you may not have access to your presets, however, when Real's network is under a heavy load.

RealOne PlayerPlus is a \$19.95 player that includes some additional features. Extra video controls, for instance, let you adjust the contrast, sharpness, and hue of your video feeds. Added CD burning features let you normalize volume across multiple tracks and create cross-fades from one track to the next.

In addition to selling a commercial player, RealNetworks bundles a number of services with its RealOne Player. Some content, for instance, is only available to subscribers. The RealOne SuperPass (\$9.95 per month) lets you access a variety of exclusive video channels and commercial-free streaming music channels. In addition, SuperPass users also receive a certain number of music credits each month. Users spend the credits listening to streaming versions of popular music. Users can also use credits to download songs they like. Downloaded music only lasts for 30 days, but you can reactivate a song after the 30-day period by using an additional credit. Additional passes are available that include a RadioPass and College SportsPass.

None of the services are required to use RealOne Player. The free player offers plenty of features for most users, and we particularly liked RealOne's interface and design.

WMP9

Microsoft

Free

<http://www.microsoft.com/windows/windowsmedia>

There's little doubt that Microsoft has an inherent advantage when it comes to distributing any sort of new software. By bundling Internet Explorer with its OS (operating system), Microsoft was able to drastically increase IE's market share. WMP enjoys the same advantage because it comes included with most versions of Windows.

Just because Microsoft can easily distribute its software by bundling it with the OS, however, doesn't mean the software is standard. In fact, the latest version of WMP is a solid all-in-one digital media jukebox.

In some ways, WMP is similar to RealOne Player. The Radio Tuner in WMP is similar to the Radio section in RealOne Player, and the Media Guide in WMP is similar to RealOne's Channels section, although RealOne's options often include content reserved specifically for subscribers. Both players can also rip and burn music from your audio CD collection. WMP encodes high-quality files using Microsoft's own WMA format. WMA offers smaller file sizes compared to similar quality MP3 files, but WMA may not be compatible with some digital music players.

WMP doesn't offer an MP3 encoder. Instead, users will need to download and install an MP3 plug-in for WMP. Unlike the high-quality MP3 plug-in for RealOne Player, WMP users will have to pay out \$9.95 for an MP3 encoder (<http://windowsmedia.com/9series/personalization/plugins.asp>). In some instances, WMP can utilize encoders included with other software, but we still prefer RealNetworks' free encoder.

WMP supports DVD playback in a similar manner. DVD plug-ins are available from third parties for roughly \$20. Adding the plug-in lets you use your DVD-ROM drive to watch DVD files in WMP. Because most



DVD-ROM drives include DVD playback software, it's not likely too many users will opt for the WMP option.

Like RealOne, WMP also links to some Premium Services from third parties, including PressPlay and CinemaNow.

Some of the best features of WMP, however, are only available to WinXP users, leaving Windows 98SE, Windows Me, and Windows 2000 users out in the cold. For instance, we liked the new tag editor in WMP 9, but it's only available on the WinXP version. New organizational tools keep your digital media library organized, but only if you're running WinXP. Although all versions of WMP 9 can burn CDs, only WinXP users can burn at speeds faster than 2X. RealOne Player, on the other hand, offers the same features regardless of your version of Windows.

Final Word

The Internet is chock-full of media file formats, and there isn't one media player that can handle all available file formats. Not surprisingly, Microsoft has decided to ignore its competitors' media formats (leaving WMP unable to read Real or QuickTime formats). RealOne Player does an admirable job of trying to support WMP and QuickTime file formats, but in the end, users will still want to have the latest versions of WMP, as well as QuickTime, installed. One caveat, however, is that all three media players like to

compete for the honor of being your default media player. Avoid the Express or Typical installation options and pay very close attention when installing each media player.

Although we recommend users install all three products, we do need to pick a winner. Both WMP and RealOne Player provide a number of nice features, including the ability to rip and burn music. In the end, however, we give the nod to RealOne Player because it does a better job of supporting multiple platforms. Some of WMP 9's best features aren't available to users running older versions of Windows, but RealOne Player does a solid job of supporting older OSes, in addition to Microsoft's latest. We also like that you can download a free high-quality MP3 encoder for RealOne Player, although we wish the encoder came preinstalled instead of as a plug-in. ■

BY CHAD DENTON

BUYING TIPS

If available, always download the free version first. You can always go back and pay for the commercial version if you decide you want it later.

It's a good idea to download free players. There are a variety of file formats on the Web, and the more players you have, the better the odds you'll be able to play a given format.

If free trial periods are available, feel free to take advantage of them, but remember you often have to provide billing information in order to do so. You'll be automatically billed at the end of your trial period if you don't cancel your subscription. Payments typically recur automatically each month until you cancel the account.

One Sweet Suite

PhotoSuite 5 Platinum

\$50

Roxio

(866) 280-7694

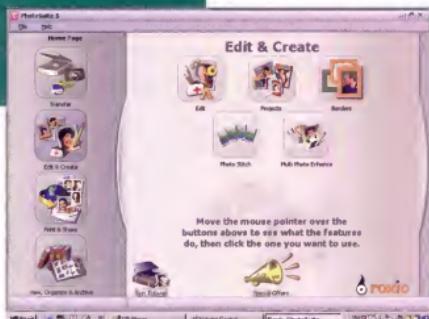
(408) 848-5594

<http://www.roxio.com>

Roxio's latest version of its flagship photo editor/organizer at first looks suspiciously like a couple of other editors currently on the market. As it turns out, PhotoSuite 5 Platinum really is a lot like those programs, but it's also more complete and costs significantly less.

When you first launch the program, it offers to locate and organize all image files on your computer automatically, tasks that we were more than happy to relinquish. If you prefer, the program will create individual albums for every image folder, and if you want it to, PhotoSuite will also find and organize sound, video, and PhotoSuite slideshow files.

After PhotoSuite creates your photo albums, you see the program's home page. This page has four large, colorful icons to help you transfer, edit, print, share, or view and organize your images. Click one of the four icons and you'll see subfunctions of each displayed on the main section of the home page, and again, each feature has a large icon with a concise caption. It's obvious that Roxio set out to make this program as easy to use as possible, and it



succeeded at least in part by providing an intuitive and logical interface.

That's a big concern for new users because many other image editors cram a huge jumble of tools into the main canvas. It only took one trip through the image-editing section to see that Roxio's straightforward system works much better for amateurs; by default, the program lists only five main editing functions: Crop, Rotate, Red-Eye Removal, Add Text, and a Photo-Doctor feature that automatically repairs image defects. Click Show All Features, though, and you'll see a more detailed list packed with special effects and more flexible tools that let you change brightness, contrast, and other image characteristics with greater precision.

As with other programs that simplify complex editing tools for the masses, at times oversimplification

leads to frustration. The red-eye removal tool is a one-trick pony; if you don't like the Auto Fix function and you can't achieve satisfactory results with the basic manual

CD Creator software. If one of your friends doesn't have a DVD player, you can email the show to her instead, and she can view it on her PC. We used the Photo Stitch tool to create a panoramic image. PhotoSuite lets you select the photos you want to meld (but only those that have identical dimensions), helps you adjust the focal length, and automatically aligns your shots, so long as they have distinct edge features.

If you prefer to keep your pictures to yourself, you can use the program's archive capabilities to save images to a CD. We used this simple tool to select the exact folders we wanted, and immediately, PhotoSuite estimated the total size of all the files we wanted to archive.

PhotoSuite also works well as an organizer. You can browse your photo collection using thumbnail images or thumbnails paired with vital information, such as dpi (dots per inch) rating, file size, location, and more. You can sort all photos by many of these traits, and if you don't like the sort options, you can use the Custom sorting command to dictate your preferences.

In spite of the rather simplistic-looking start page, PhotoSuite 5 is an expansive program packed with tools to help digital imaging amateurs take their skills to a new level. Considering this application's low price and ease of use, we recommend it. ■

BY NATHAN CHANDLER

Mighty Little Backup

If you're searching for a good backup utility or if you're not satisfied with the backup and scheduling features included with your Windows operating system, give Argentum Backup a try. It works with Windows 95/98/Me/NT/2000/XP, takes roughly 10 minutes to download from Argentum's Web site using a 56Kbps (kilobits per second) Internet connection and less than 30 seconds to install, and occupies 985KB worth of hard drive space after installation.

The Tasks tab in the main program window displays icons for each backup task. The default tasks are My Documents, My E-mail Contacts And Messages, and

Windows Shell Settings (all settings, including power management schemes, and Favorites). You can use this tab to change what folders get backed up, set up an automatic backup schedule so you won't have to do the work manually, add new backup tasks (here you get to customize everything, down to the icon used to represent the task), or perform a backup on the spot.

The program creates a zipped (compressed) backup file, which you can then copy to a Zip drive, floppy diskettes, or CD-R/RW (CD-recordable/rewriteable).



Advanced users can tinker with the program so that it works with packet-writing CD-burning software, such as Ahead Software's Nero Burning ROM or Roxio's Easy CD Creator.

In our tests, the program did a great job of backing up our customized folder containing various documents and digital photos; it backed up 18.7MB worth of files into a 5.03MB zipped

Argentum Backup

\$25
Argentum
(877) 353-7297
(425) 392-2294
<http://www.argentuma.com>

file in eight seconds. By selecting the Options tab in the main window and clicking Review, you can see a complete report of what files you backed up.

You can download a free trial version to see if the program does what you need, or you can pay \$25 for the full version. The trial version limits to four the total number of permissible backup tasks. ■

BY CAL CLINCHARD

On The Road Again

A good mapping program helps you make the most of your travels. There's no point in wasting valuable vacation time trying to find the nearest hotel or a place to eat. DeLorme's Street Atlas 2003 includes several features to help you plan your travels.

Street Atlas has an easy-to-use interface. Navigational tools run along the right side of the screen, and program tabs and buttons are in a pane below the large menu pane. Street Atlas can create driving routes from one location to another. If you click the Calculate button, Street Atlas estimates the trip mileage. If you enter the estimated

travel speeds and number of hours you would like to drive each day, Street Atlas can estimate the total traveling time. Similarly, if you enter the size of your car's gas tank and average gas mileage, the program estimates when and where you should stop for gas.

As you move the pointer over map locations, the corresponding location name appears in the lower-right corner of the screen. Earlier versions of DeLorme's software didn't have this display. As a result, it was

often difficult to select the correct point on the map.

One of the most useful features of Street Atlas is Find Travel POIs (points of interest). POIs include hotels, fast-food restaurants, gas stations, dining establishments, parks, and camping sites. You can search for POIs in the vicinity of either planned stops or the roads you will travel.

Keep in mind that this program has only U.S. data.



If you live in Alaska and want to route a trip out of state, Street Atlas USA won't work. You'll need a program with Canadian data. Also, if the shortest route between two U.S. cities involves Canadian travel, expect Street Atlas USA to produce a route that stays on U.S. soil.

Other than those limitations, however, Street Atlas USA 2003 is an excellent trip-planning tool that is significantly improved over previous versions. ■

BY KYLEE DICKEY

Street Atlas USA 2003

\$49.95
DeLorme
(800) 561-5105
<http://www.delorme.com>

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- Norton AntiVirus™ 2003³

\$599.⁹⁹



eMachines recommends Microsoft® Windows® XP



www.emachines.com/sc or 1-866-824-6463

Each desktop system comes standard with Impeccable value and speed. System varies by model. Monitor sold separately. Actual product may vary from photo. *New customers only. To avoid paying monthly membership fees, cancel during the 6-month promotional period. Telephone usage charges and/or surcharges may apply. **For complete warranty information see www.emachines.com. *Applicable usage taxes are added for residents of CA, IL, MD, NJ, OH. **Efficient.com is responsible for terms in copywriting or photography. Efficient.com is a registered trademark of Efficient.com, Inc. Intel and Celeron are trademarks or registered trademarks of Intel Corporation. Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. Symmetric and the Symmetric Trademark are registered trademarks of Symmetric Corporation in the United States and other countries. All other company and product names are trademarks and/or registered trademarks of their respective owners. © 2003 eMachines, Inc. All rights reserved.

Impulse Items

Compiled by Joshua Gulick

Cool Stuff For Less Than \$20

See it, like it, buy it. Impulse Items are products that capture your attention but won't make you dig too deep into your wallet. Check these pages each month for the latest interesting and inexpensive computing items we've run across.

ADJUSTABLE WRIST STRAP

When you walk across the carpet to your computer desk, you build up more than enough static electricity to destroy your computer's hardware. The computer case protects the components when you press the power button or plug in peripherals, but it can't shield them when you open the case to work on your computer. To avoid accidentally frying your motherboard the next time you add memory, wear an antistatic wrist strap. The wrist strap lets you ground yourself by attaching the cord to a piece of metal (for example, the computer case panel). Viziflex Static Solutions (<http://www.viziflexstaticsolutions.com>) offers the wrist straps for \$6.95 (6-foot cord) and \$9.95 (12-foot cord).



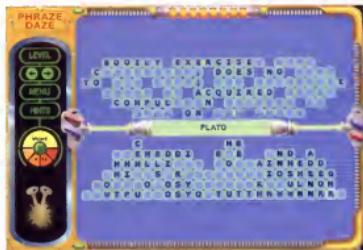
RATPADZGS

You don't have to be a video game expert to help your favorite gamer improve her performance. The RatpadzGS (<http://www.ratpadz.com>) is an extremely large (9.3 inches tall x 11.5 inches wide) mousepad. The smooth surface lets her move the mouse with better precision than she can on a traditional mousepad. The RatpadzGS (Gaming Surface) replaces the Ratpadz and includes several new features, such as the ribbed bottom, which lets the mousepad's feet grip the desk tighter. The Ratpadz works with traditional and optical mice and is available for \$13.

MOUSERUG

You were thrilled when your daughter put the family picture on your new mousepad, but you use your computer every day, and Uncle Phil's face is wearing off month by month. Instead of settling for a dull, single-color replacement, decorate your desk with a stylish rug. MouseRug.com (<http://www.mouserug.com>) offers tiny rugs that make soft mousing surfaces. Browse nine MouseRug categories, including Gregorian, Designer, Celtic, and Persian collections. The rug's fibers clean your mouse ball as it rolls across the surface. You can use both optical mice and traditional mice on the MouseRug. Select your favorite rug for \$19.95.





PHRAZE DAZE

If you're tired of hearing shotgun blasts and grenade explosions in the next room, round out your child's video game collection with Dexterity Software's (<http://www.dexteritysoftware.com>) Phraze Daze. The word-puzzle game includes more than 300 puzzles at three skill levels. To complete the puzzle, you must pull letters from one half of the screen and place them into the letter boxes on the other side to form the mystery phrase. The game is harder than it sounds because you must pick the appropriate letter for each box from several available letters. If you can't solve the puzzle, you can find help in the hints section or reduce the skill level. Try Phraze Daze free or download the full version for \$19.95.



DISC GUARDS

Anyone who regularly uses CDs spends plenty of time and money trying to protect the fragile discs from scratches. You can store your CDs in plastic cases or CD wallets, but if you drop the

CD as you transfer it to your computer or CD player, you can damage the disc and

lose the information on it. If you need better protection for your CDs, visit Proline at <http://www.ami-proline.com>. Proline's Disc Guards are thin film labels that cover the data surface of the CD. You can read data from (or write data to) the CD after you attach the Disc Guard. Proline offers the Disc Guards 10-pack for \$12.95.



FlyFan

Do you dread hot, cramped airplanes? You won't need to struggle with the tiny fan overhead if you have a FlyFan in your carry-on. Don't worry about bumping the passenger next to you; the fan blades are nylon. Simply turn on your notebook and plug the fan into the USB (Universal Serial Bus) port. The fan draws power from your notebook. (It lowers the notebook's battery life by about five minutes per hour.) You can direct the airflow by bending the fan's long neck. Buy the FlyFan from Kensington (<http://www.kensington.com>) for \$19.99.

iPOD/MP3 POUCH

You can easily slip a portable MP3 player into your backpack or purse, but if you want to take it with you when you walk or jog, you'll need a small pack you can attach to your belt or body. Shoreline (<http://www.shorelinecases.com>) designed the new iPOD/MP3 Pouch to hold the iPOD MP3 player (the clear case window has holes for the iPOD's buttons), but you can use it to carry other types of MP3 players, as well. The case includes a button clip and a D-ring for other straps. You can buy the iPOD/MP3 Pouch in indigo, black, or royal blue for \$14.99.



Windows XP

Steady As She Goes

Now that the new Windows XP Media Center Edition is on the market (see the FAQ on page 106 for specifics), the folks at Microsoft are hard at work developing the next big Windows OS (operating system), code-named Longhorn and due for release in late 2004 or early 2005. In the meantime, the company has released three new WinXP updates (Microsoft's term for patches).

You can access any of these updates using WinXP's Windows Update program and an active Internet connection. Click Start, All Programs, and Windows Update to launch the program, and then follow the on-screen instructions. For details about how Windows Update works, refer to the "Windows Update Revisited" tip on page 27 of the May issue of *Smart Computing*, or open the WinXP Help And Support Center, type Windows Update in the Search field, and press ENTER.

System Restore & Networking

If you're using either the Home or Professional edition of WinXP and have installed WinXP Service Pack 1, you could experience problems if you use the System Restore feature to roll back your system to a time before you installed WinXP SP1.

You might not be able to create a dial-up Internet connection, access an existing dial-up

Internet connection, access a remote network, use the Internet Connection Sharing feature, or run the Internet Connection Firewall program. To prevent such problems from occurring, Microsoft recommends that you download and install the Q329441 Critical Update immediately. The update is 504KB and takes about three minutes to download.

If you have already run into the difficulties described above, Microsoft recommends that you work around it by using the Windows Update program to reinstall WinXP SP1. You can read more about this and other WinXP updates by reading the Knowledge Base article that describes it. You can find any Microsoft Knowledge Base article by

visiting the Microsoft Help And Support Web site (<http://support.microsoft.com>). Click the Search The Knowledge Base link, scroll down to find How To Search For A KB Article By ID Number, type the six-digit Knowledge Base article number in the Search For field (for this update you would type either Q329441 or 329441), and click the green arrow.

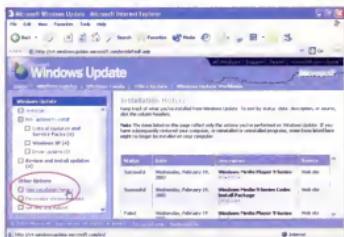
Yes, We Have No Drivers

In addition to bringing you all the latest WinXP updates, the Windows Update program occasionally rounds up new device drivers (programs that help hardware components and peripherals communicate with your OS) and lets you download and install them using the standard Windows Update procedure. However, if you're using Windows 2000 and any edition of WinXP (including the Tablet PC and Media Center editions), you might find that the Windows Update program locates drivers for your PC but won't let you successfully download them.

According to Microsoft, this occurs when a certain WinXP directory happens to contain a "large number" of Windows setup files with an .INF extension. Microsoft doesn't explain what constitutes a "large number" of these files. To prevent the driver download problem, Microsoft recommends that you download and install the 814033 Critical Update immediately. It's 416KB and takes about two minutes to download.

An Update To Fix An Update

What would a month be like without an update that prevents crackers from accessing and taking control over your PC? We may never know, as this month we have yet another one. You might recall that on page 26 in the April issue of *Smart Computing* we described the Q328310 Security Update. The update fixes a vulnerability that could potentially let a cracker pretend to be an administrative user and thereby gain overall access to your computer. This month we have the 814995 Recommended Update, which solves some software compatibility problems that can occur after you install the Q328310 Security Update. The 814995 Recommended Update affects Windows NT/2000/XP users. It's 994KB and takes about five minutes to download. ■



To obtain information about the updates you have already installed, click the View Installation History link under Other Options in the Windows Update pane.

WinXP Tips Since WinXP's release, we've encountered dozens of tips for enhancing and customizing WinXP. Here are a few especially handy ideas that work with both WinXP Home Edition and Professional Edition.

Add Windows Update & Other Programs To The Start Menu

If you're using the default Start menu that came with WinXP, the menu's left side is split in two by a thin gray dividing line. WinXP keeps track of what software you use, so the icons in the lower portion of the Start menu are shortcuts to programs you've used often and recently. The icons in the top portion are a fixed set of program shortcuts; they won't change unless you change them yourself. If you'd like to add the Windows Update icon to the top part of the Start menu so that it's always there when you need it, click Start and All Programs, and then click and drag the Windows Update icon to the Start menu. This works for other programs, as well. If you want to remove an icon from the Start menu, simply right-click it and select Remove From This List. ▀

Access Details About Installed Updates

Whenever you use the Windows Update program, you have a chance to review all the details about each new WinXP update. But after you've downloaded and installed the latest WinXP updates, you have to do a tiny bit more digging to find out more about those updates. As long as you have an active Internet connection, click Start, All Programs, and Windows Update to launch the Windows Update program. This opens a browser window (Internet Explorer, unless you've assigned a different default browser) and loads the Microsoft Windows Update home page. In the Windows Update pane on the left, find the Other Options heading. Beneath that heading, find and click the View Installation History link. This brings you to the Installation History page for the computer you're using. It includes information about each update, including whether it was successfully downloaded and installed, the installation date, update source, and update description. Most descriptions also include a Read More link; click that link to access details about the update. ▀

Scan & Flip

If you frequently scan pages out of bulky books, notebooks, or bound photo albums, this

tip could help you out. Depending on the type of scanner or multifunction device you use, the scanner lid might not easily accommodate thick or oversized materials, forcing you to bend books to position them correctly for scanning. If it's possible to alleviate the stress to the scanner lid by turning the book or album so that it's in an upside down position, go ahead and scan it that way. Next, open Windows Explorer on your computer by right-clicking Start and selecting Explore. Locate the upside down image file you just scanned, right-click it, and select Open With and Windows Picture And Fax Viewer. Press CTRL-K once to turn the image on its side, and then press CTRL-K again to turn the image so that it's oriented right side up. Finally, press CTRL-S and in the Copy To dialog box click Save and then Yes to save the image as it now appears. ▀

Make Windows Explorer Consistent

When you use Windows Explorer, do you have a certain view that you generally prefer? For example, do you always click the Views icon and select Details so you can tell at a glance the name, size, type, and modification date for each file in the current folder? Or do you always go for the List or Thumbnails view? Whatever your view preference may be, you can tell WinXP to automatically use that view whenever you open any folder in Windows Explorer. To do this, right-click Start and select Explore to open Windows Explorer, then select the view you want. Next select Folder Options from the Tools menu, select the View tab, and click the Apply To All Folders button. In the Folder Views dialog box that appears click Yes, and you're all set. ▀

Alter WinXP's Special Effects

Do you find it distracting when you select a program menu and it scrolls into place? This is an example of an effect you can change or do away with altogether. Right-click any open area on your computer's Desktop and select Properties. Select the Appearance tab and click the Effects button. In the Effects dialog box, select different effects to suit your taste. This might take some trial and error, and you'll need to click OK before you can try out each effect. ▀



Imaging Wizard

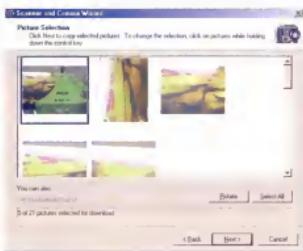
Microsoft introduced the Scanner And Camera Wizard with Windows Me to simplify the task of transferring digital images from your scanner or camera to your PC. Although using the wizard is simple, making the wizard work may take some effort. We'll look at what you need to use the wizard to gain control of your digital images.

The Good & Evil Of Wizardry

WinMe's Scanner And Camera Wizard works with devices that have a WIA (Windows Image Acquisition) driver installed. The wizard doesn't work with devices that use a TWAIN (Technology Without An Interesting Name) driver, the industry standard. Therefore, there are advantages and disadvantages to using the wizard.

Pros. The wizard's greatest benefit is that it makes image transfer simple. It shows a preview of the photo or document in your scanner and thumbnail images of each photo in your camera's memory. You can copy only selected files from your camera rather than all stored images. You can also make alterations to images before copying them to your PC. (You might want to rotate a scanned image of Aunt Louise 180 degrees before you upload it so that it doesn't appear as if she's dancing on the ceiling.)

Cons. If your device doesn't have a WIA driver installed, you will see a No Scanner Or Camera Has Been Detected error message when you try to launch the Scanner And Camera Wizard. WIA is a Microsoft standard and is not widely adopted. Only two of the seven cameras we attached to our WinMe system supported the WIA standard. The other five cameras either appeared as USB (Universal Serial Bus) mass-storage devices or had a TWAIN driver. These devices still worked with WinMe, but we couldn't use the Scanner And Camera Wizard. If your camera is a USB mass-storage device, you can use Windows Explorer to



Windows Me's Scanner And Camera Wizard lets you select only those images that you want to transfer to your PC. You can also make adjustments, such as rotating images.

our WinMe system supported the WIA standard. The other five cameras either appeared as USB (Universal Serial Bus) mass-storage devices or had a TWAIN driver. These devices still worked with WinMe, but we couldn't use the Scanner And Camera Wizard. If your camera is a USB mass-storage device, you can use Windows Explorer to

browse and copy files to your PC. If you have a device with a TWAIN driver, you can use the software that came with your hardware or a program such as Adobe Photoshop.

You should also be aware that some functions of your TWAIN-based imaging software may no longer work once you replace the TWAIN driver with a WIA driver. For example, you may need to use the program's menus to select the scanner or camera rather than letting the program detect the device automatically.

WIA Woes

You may need to do a little work to make the wizard recognize your hardware devices. In fact, as we mentioned above, without a WIA driver, the wizard will not even work with your scanner or camera. There are, however, a few tricks for installing the appropriate WIA driver.

To tell if you have a WIA driver installed, attach your camera or scanner. If the Scanner And Camera Wizard launches, a WIA driver is installed. If the wizard doesn't load, click Start, point to Settings, click Control Panel, double-click Scanners And Cameras, and right-click the icon of your camera or scanner. If you see Use Wizard on the context menu, a WIA driver is installed.

If Use Wizard doesn't appear on the context menu, you should uninstall your device's current driver. Right-click the My Computer icon on your Desktop and click Properties. Click the Device Manager tab. Make sure your scanner or camera is connected to the PC and then click the plus sign (+) next to Imaging Device to see a list of all associated devices. Click the icon of the device to uninstall, click Remove, and click OK.

Check the device's documentation to see if the device has a WIA-compliant driver. If it does, follow the instructions in the users manual to install the WIA driver and then restart your computer. If you can't tell if the device has a WIA driver, do not install the software on the CD-ROM.

Next, see if Windows has a built-in WIA driver. Without first installing any software, plug the device into the appropriate port on your PC. After Windows locates and installs a driver, click Start, point to Settings, click Control Panel, double-click Scanners And Cameras, and right-click your device's icon. If you see Use Wizard in the context



menu, Windows found a WIA driver for your device. If it did not, uninstall the driver through the Device Manager as described above. Then check the manufacturer's Web site for a downloadable WIA driver. If you cannot find a WIA driver on the manufacturer's site, your device will not work with WinMe's Scanner And Camera Wizard, but you can still use the device with its bundled software.

Off To See The Wizard

Once you have a WIA driver installed, attach your camera or scanner to your PC, and press the Power, USB, or Go button (according to the manufacturer's instructions), the Scanner And Camera Wizard starts automatically.

You may also start the wizard manually by clicking Start, pointing to Programs and Accessories, and clicking Scanner And Camera Wizard. If you see a No Scanner Or Camera Has Been Detected message, you do not have a WIA driver installed. See the "WIA Woes" section above to troubleshoot the device.

Once the wizard loads, click Next to start. If you attach a digital camera, you will see thumbnail images of each photo in the camera's memory. By default, all images are selected. Press CTRL while clicking individual thumbnails to add or remove them from the batch to transfer. Selected images are outlined. To deselect all images, click the white space to the right of the thumbnail images.

To rotate an image, deselect all images. Then click the desired image and click the Rotate button. Each click of the Rotate button rotates the image clockwise 90 degrees.

After you select all images you want to transfer, click Next. In the first field, type a prefix for your photos' file names. For example, if you accept the default, Picture, the wizard will name your image files Picture 001, Picture 002, and so forth. To save photos to a location other than your My Pictures folder, click the Browse button, select the folder to which you want to save images, and click OK.

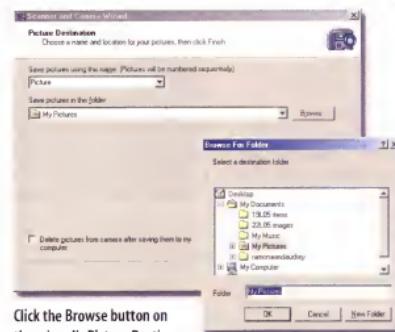
If you want the wizard to delete the photos from the camera after transferring them, click to select the Delete Pictures From Camera After Saving Them To My Computer checkbox. If you select this option, remember to use your camera to format your memory card from time to time. This will avoid image-file corruption in the long run. Click Finish when you are ready to transfer the images.

If you attach a scanner, the wizard displays a preview of the photo or document. Select the type of image you want to scan (Color Picture, Grayscale

Picture, Black And White Picture Or Text, or Custom Settings) by clicking the appropriate radio button. If you want to crop the image, click and drag the dotted lines around the preview image to the desired dimensions.

You can make further adjustments by clicking Adjust The Quality Of The Scanned Picture. In the resulting Advanced Properties dialog box, click and drag the slider bars for Brightness and Contrast to the desired levels. The thumbnail image in the dialog box demonstrates the results of any changes. You can also adjust the resolution by highlighting the value in the Resolution (DPI) box and typing a new DPI (dots-per-inch) number. Click OK. When you are ready to scan the image, click Next.

After the wizard copies image files to your PC, Windows opens the folder to which the wizard saved the files. You will notice that the wizard automatically creates dated folders for images. For example, if you configure the wizard to save photos in your My Pictures folder on June 15, 2003, the wizard will create a subfolder within the My Pictures folder called 2003-06-15 and save your images into that folder.



A Bit Of Wizardry

If you have WIA-compliant drivers, you are ready to take advantage of WinMe's Scanner And Camera Wizard, which makes transferring images a breeze. If your imaging devices won't work with this wizard, remember that you can still use the software that came with your scanner or camera. ■

BY KYLEE DICKEY

Think Ink

Save Big Bucks On Inkjet Printing



FACE IT: WORDS AREN'T CHEAP, especially when they're printed from an inkjet printer. And if a picture is worth a thousand words, well, time to get out your wallet.

Printer makers may sell their hardware for a pittance, but anyone who's had to refill an inkjet printer knows that the ink is where Epson, Lexmark, and the like make their real money. An OEM (original equipment manufacturer) black cartridge for a \$100 Epson C80 color printer costs \$32.99, a third of the price of the printer itself.

"Ink for a wide-format printer costs \$40 per liter. If you take the ink that goes into an inkjet cartridge, it's costing about \$1,000 per liter. They're giving customers the printers, but they're charging them a fortune for ink," says Tricia Judge, president of the Imaging Technology Council, a trade group for third-party ink and toner companies.

Ink is a big business: \$21.3 billion of inkjet cartridges were sold worldwide in 2002, according to research firm Lyra Research. Sensing an opening, dozens of small companies now sell "compatible" or "remanufactured" cartridges for consumer inkjet printers at deep discounts over the official cartridges. We found third-party versions of that

\$32.99 Epson cartridge online for prices ranging from \$20.46 down to \$9.95.

In the third-party realm, there are three different ways to pump up your printer for pennies. Compatible cartridges are brand-new boxes, often built in China; the same Chinese manufacturer may make cartridges sold under several U.S. brand names. Remanufactured cartridges are official OEM cartridges that are cleaned out, professionally refilled, and put back on sale. For most HP printers, remanufactured cartridges are the only option because HP carts include patented print heads that are illegal for third parties to copy.

Finally, there are refill kits, containing ink and needles for you to refill a cartridge on your own. OEM and third-party cartridge manufacturers alike say consumers should stay away from these if they're concerned with quality; professionally remanufactured cartridges are cleaned and sealed in a way you just can't do at home.

Not Just Water & Dye

In their defense, printer manufacturers say they pour hundreds of millions of dollars into developing inks that work with an individual unit's

print heads, drivers, and paper. Designed for flexibility, endurance, and brightness, inks are complex chemicals, not just water and dye. Some cartridges include precision-made print heads, as well. Even the plastic ink tanks are specially designed to prevent inks from changing color over time, printer manufacturers say.

"Our drivers are very specifically tuned to our inks," says John Lamb of Canon. "If you go out on the market, many of the third-party inks [sold for Canon printers] are those that you'd put into some other manufacturer's printer, as well. Generic inks just don't produce prints as good as specially-tailored inks," he says.

There's also a wide variation in quality in the third-party ink industry, experts say. The worst third-party cartridges could clog or destroy print heads. (It's safer to try new inks on inexpensive printers or on HP or Canon printers with disposable print heads, rather than on high-end Epson printers, which have permanent heads.)

"At the low end, you have products that could potentially damage your printer. At the high end, you have products where the difference from the OEM is imperceptible, except for the fact that the customer can save 30% to 50%," says Jerry Chamales, president of Rhinotek (<http://www.rhinotek.com>), an established third-party ink firm.

Killer Chips

With much of their profits coming from ink cartridges, it's not surprising that some printer companies are thinking about protecting themselves from the competition.

On Feb. 27, 2003, a federal judge issued a preliminary injunction saying that third-party company Static Control couldn't clone "killer chips" that Lexmark puts in certain laser printer toner cartridges to prevent them from being refilled by third parties.

The ruling set third-party ink companies on edge, as the judge's reading of the Digital Millennium Copyright

Act, if taken to its logical extreme, could create a marketplace where printer companies embed microchips in their ink cartridges and third parties are forbidden from copying, hacking, or resetting them, essentially killing the market for cheap ink.

But that's unlikely to happen, says analyst Forrest. The case has several years left before a final decision, and aftermarket companies are already working out a way around the ruling.

Epson, Canon, and HP all swore that they're not planning to put any killer chips into their cartridges. Epson cartridges do include a chip that monitors the ink level, but a refiller can legally reset that chip, according to Epson Consumables Group Manager Rajeev Mishra. HP uses chips in a small number of cartridges, but the chips don't lock out third-party cartridges.

And although HP and Canon execs say they'd prefer you to use their cartridges, they're not about to force you to do so. "Limiting consumer choice is not a strategy that HP believes in," says HP Vice President of Marketing Stefan Schmidt.

Epson, HP, and Canon also all said using third-party cartridges doesn't violate a printer's warranty, unless the third-party cartridge can be shown to have damaged the printer.

Meanwhile, the printer industry is getting a goose from the European Union, where a new law will forbid manufacturers from embedding any chips that prevent third parties from refilling ink cartridges, starting in 2005. In the United States, New York, Texas, and California encourage state contracts to go to printer makers with easily-refillable cartridges.

The Great Ink-Off

To find out if third-party inks are worth the paper they're printed on, we subjected four brands to a series of tests on a six-color Canon i950 printer. We printed color spectra, a half-dozen photos, and some text memos to check color saturation and consistency.

The difference in cost between our inks was substantial. An official Canon BCI-6 cartridge costs \$11.99. Carrot Ink (<http://www.carrotink.com>) sells its own brand cartridges for \$7.95. Rhinotek sells its through CompUSA.com for \$7.36, and Tyler Martin (<http://www.tylermartin.com>) sells a generic Chinese cartridge for \$2.95.

When it came to printing text, we couldn't tell the difference among the various brands of ink.



Differences between Canon and third-party inks were clearest on Canon's top-quality photo paper, shown here. Top: All our images printed with Canon ink, and some of the ones with third-party inks, came out this sharp and clear.

Bottom: Our major problem with third-party inks on fancy paper was consistency. At their worst, when used with Canon's special photo paper, the third-party inks delivered washed-out images such as this one.

Photos on plain paper were also pretty good all around: Canon's inks provided the truest colors and highest saturation, followed by Tyler Martin, Rhinotek, and finally Carrot Ink, but even the worst print was acceptable; the differences appeared mostly in the richness of dark areas.

When it came to printing photos on Canon's high-end matte photo paper, the printer maker's R&D truly paid off. Our Canon inks provided reliable top-quality photos on this high-end paper, with colors much richer and blacks much darker than on plain paper. The Tyler Martin inks came second; while at their best they were nearly indistinguishable from Canon's, some images were very washed-out on multiple printings. Rhinotek pictures seemed less saturated than the Canon images but were consistent. And Carrot Ink's cartridges clogged our photo-cyan print head three tries in a row when printing on photo paper, creating severe problems with color banding and balance.

Clearly, you do get what you pay for with ink. If you're looking for photos that could have come from a professional lab, OEM inks are the way to get the most out of your printer. But if your low-end inkjet churns out mostly term papers and throwaway Web page printouts, discount inks are good enough.

Save Your Ink

If you're trying aftermarket ink, go with a solid name, experts say. There's still considerable variation in the industry. Judge, Forrest, and others recommended Rhinotek, GRC/Jet-Tek (<http://www.printgrc.com>), and IJR (<http://www.jjr.com>) as reliable brands.

But even if you're sticking with official inks, there are still ways to bring down the costs of inkjet printing, says Epson's Mishra, who recommends going into your printer's Printing Preferences or Page Setup dialog box and making some changes. Switching from Best to Economy mode for printing text and Web pages can extend cartridge life. Switching from color to black and white printing for Web pages saves color cartridges. And testing out photos on plain paper before switching to glossy stock saves big bucks on paper.

"Those simple changes in behavior can make a big difference," he says. ■

BY SASCHA SEGAN

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Networking Without The Wire

Ever since the advent of the remote control, it seems everything in our life has been going wireless. Phones, mice, and even keyboards have shed their wires in past years. Now the wires that connect us to our local computer networks are beginning to disappear as a host of wireless networking technology makes its way into our homes, businesses, classrooms, and even local coffee shops.

There are several wireless networking specifications. A specification the IEEE dubbed 802.11b is perhaps the most popular wireless networking standard. Operating in the unlicensed frequency band between 2.4GHz and 2.4835GHz (commonly referred to as the 2.4GHz band), 802.11b can transmit data at 11Mbps (megabits per second) over a distance of roughly 100 meters.

Other wireless networking standards, including 802.11a and 802.11g, deliver higher speeds but are not always compatible with other wireless networking specifications.

Because 802.11b is the oldest and the most popular of the wireless networking specifications, we'll take a closer look at how an 802.11b wireless network might operate.

Anatomy Of A Network

Like a traditional LAN (local-area network), a WLAN (wireless LAN) can be simple or complex. WLANs can operate in one of two modes: Ad-Hoc or Infrastructure. In Infrastructure mode, it's possible for network access points to communicate with other access points creating a mesh network.

Ad-Hoc Mode

In Ad-Hoc mode, nodes in an 802.11b network communicate directly with one another.

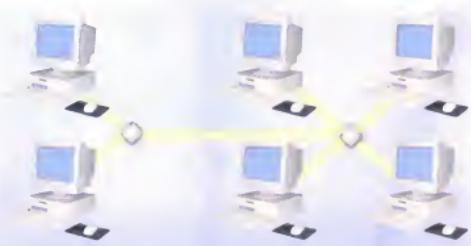


Infrastructure Mode

When operating in Infrastructure mode, 802.11b nodes communicate through a central access point. The access point receives data from one node and passes it along to the proper recipient. In some cases, the access point may act as a bridge or router connecting the WLAN to another network. For instance, consumers may use a wireless router to share a cable or DSL (Digital Subscriber Line) connection with multiple home PCs over 802.11b.

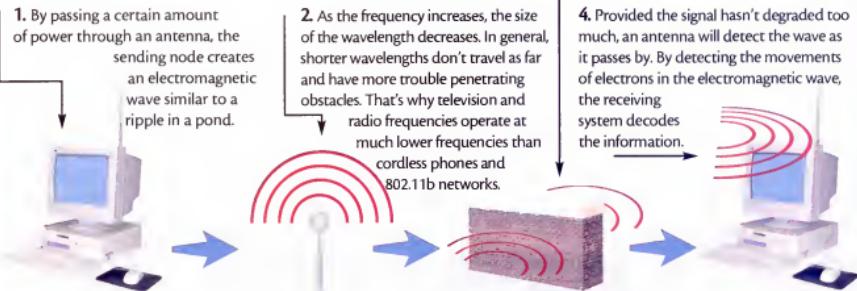
Mesh Networks

802.11b access points can communicate with other access points, extending the coverage of an 802.11b network.



Do You Read Me?

802.11b uses RF (radio frequency) to send and receive signals. The basic technology isn't much different from the technology radio and television stations use to broadcast music and programming.



Is It Crowded In Here?

Radio receivers are designed to listen for a signal on a specific frequency. If there is more than one signal on the same frequency, the receiver may have trouble distinguishing one signal from the other. This is commonly known as interference. Unfortunately, there are a lot of consumer devices that use the same 2.4GHz band as 802.11b. Cordless phones and microwave ovens are common causes of interference with an 802.11b signal.

1. To avoid interference, 802.11b uses a technology called DSSS (Direct Sequence Spread Spectrum). 802.11b breaks down the 2.4GHz band into 14 channels, each roughly 22MHz. 802.11b devices sold in the United States use roughly three of the 14 available channels.

2. When sending information, the transmitter picks an available channel and uses the entire 22MHz channel to broadcast the data along with redundant bits known as chips. The receiver can use the chips to re-create any data lost to interference. If interference becomes too great, the receiver may request that data be sent again.

Can I See Some ID?

As we mentioned earlier, any antenna can detect an electromagnetic wave, so any 802.11b device can pick up signals from an 802.11b network. In some instances, outsiders may be able to use a network to connect to the Internet or access a company's internal network. The following are the primary security features built into 802.11b.

SSID

SSID (System ID) is like an ID badge for computers attempting to access a wireless network. A node attempting to access an 802.11b network presents an access point with an SSID. If the system administrator has given the system with that SSID permission to access the network, it's allowed to connect.

WEP

SSID does nothing to prevent someone from snooping in on data flowing across a wireless network. WEP (Wired Equivalency Privacy) encrypts information before sending it. Only devices with the proper key can decrypt the information. Unfortunately, WEP has had a number of security problems and is far from fail-safe.

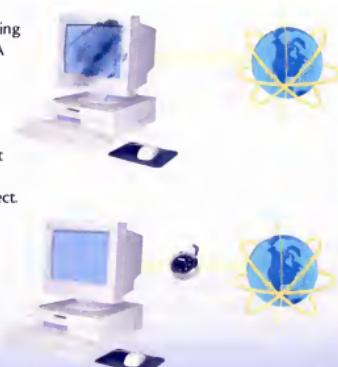


Image File Frenzy

5 Important Image Formats

IN THE COMPUTING WORLD, acronyms abound to refer to different types of computer technology. You have USB for Universal Serial Bus, SCSI for Small Computer System Interface, and P2P for peer-to-peer communication. And then you have all those file extensions to remember, including DOC (document), EXE (executable), XLS (Excel), and DLL (dynamic-link library).

Image file formats add even more to the pot with such acronyms as BMP, JPEG, and PNG. With so many types of image file formats, it's hard to keep them straight. And it's even harder to remember what each one is used for. To help untangle this mess of acronyms, we spent some time finding out exactly what's behind these image file formats.

We Must Compress

First we should discuss data compression and how it relates to image files. Generically, data compression is the process of squeezing information into a smaller size, so the data occupies less space and takes less time to transmit or download. Compression technology identifies identical, or redundant, pieces of information and packs those individual pieces into one packet. For images, there are two main types of compression: lossless and lossy.

With lossless compression, file size is reduced, but no data is lost in the process. When you open the

compressed file, the image retains the quality of the original. If you're working with precisely detailed images, lossless compression ensures those details are still present after the



file is compressed. Lossless compression is also useful for line art and images with limited color ranges, including large areas of common colors.

Lossy compression results in much smaller file sizes because it throws away redundant information. When you open the compressed image, the tossed-out information is re-created. For example, in an image of a blue sky, thousands of pixels are the same color of blue. To reduce the file size, when this image is compressed, most of those similarly colored pixels are thrown out and replaced with an

algorithm stating how many times the one blue pixel left should be repeated when the image is opened.

Bit Map vs. Vector

There are two types of images: bit map (also known as raster) and vector. Bit maps are composed of pixels, or picture elements, in a grid. Pixels identify where each individual square of color is located in the image. The number of pixels per square inch (ppi), or dots per inch (dpi), determines the image's resolution. Bit maps are resolution-dependent: the higher the resolution, the higher the image quality.

For most monitors to display bit maps accurately, the image must be saved at no less than 72dpi. For printing, the dpi required bumps up to 300. Because bit maps are resolution-dependent, resizing the image affects the quality. When you decrease the image size, pixels are lost, and when you increase the size, pixels are added through a process called extrapolation. To add pixels, the color of the new pixels is based on the color of the surrounding pixels. Too much extrapolation can lead to a jagged look, called aliasing. In addition, by enlarging a bit map, you begin to see individual pixels because the pixels themselves don't resize. Other bit map disadvantages include the restriction of a rectangular shape for all images and the general inability to support transparency in images.

On the bright side, bit-mapped images allow for high levels of details, such as what you see in a photograph. You can also rely on bit maps to accurately render images with subtle shading. These pluses make bit maps a good choice for publishing images on the Web.

Vector images, on the other hand, employ mathematical formulas to render images. A vector file is actually a

text file that contains instructions describing how an image should be drawn on-screen. Vector images are resolution-independent, which means the image's size doesn't affect display or print quality. The ability to resize images with little or no loss of data makes vector images well suited for line art and illustrations because they can be resized as necessary. However, vector images don't handle highly detailed images very well. They are best used for cartoon-like images or line art that contain solid areas of color or gradients.

Common File Formats

There are hundreds of image file formats out there; however, most computer users are familiar with only a handful of formats.

BMP. BMPs (bit maps) are native to the Windows OS (operating system) and are used in Windows background images. BMPs can use as many as 24 bits of color per pixel, which means you can produce monochrome, grayscale, or full-color BMP images. Lossless compression, typically RLE (Run-Length Encoded), is used to reduce the BMP's large file size. Among bit-mapped formats, BMP is the least sophisticated and thus is not as well suited for complex imagery as some of the other bit-mapped formats we're about to discuss. BMPs are better suited for line drawings and simple color images, rather than photographic images.

TIFF. Like BMPs, TIFFs (Tagged Image File Format) can use as many as 24 bits of color per pixel, which

translates to more than 16.7 million color choices. For high-resolution color images, TIFF is a good choice because it supports several color depths. However, high resolution leads to larger file sizes. Because of the larger file size, TIFF images are preferred for the storing and printing of high-resolution color images. The TIFF file format is widely accepted, and most imaging software supports it, but it is rarely found on the Web.

JPEG. Pronounced "jay peg," the JPEG (Joint Photographic Experts Group) image file format is one of three main image formats found on the Web. A big reason for its use is its high compression rate: a JPEG (which Windows often shortens to JPG) can be reduced to as little as 5% of its original size, which translates to faster

Image Viewers

You have tons of images stored on your computer, but you aren't sure what to use to view them. You can find several free or low-cost applications for viewing your images. Here are three candidates:

IrFanView. This free image-viewing program, available at <http://www.irfanview.com>, has more to offer than simply viewing images. You can sort and manage all of your audio and video files, as well. IrFanView supports several image file formats, including the usual BMP (bit map), JPEG (Joint Photographic Experts Group), GIF (Graphics Interchange Format), PNG (Portable Networks Graphic), and TIFF (Tagged Image File Format), and the not-so-usual EPS (Encapsulated PostScript) and PSD (Adobe Photoshop format). You can view your

images as thumbnails or in a slideshow. In addition, you can edit, save, and print your image files.

XnView. This not-so-basic image viewer also lets you sort, browse, and convert your image files at no cost. In addition to images, you can use XnView (<http://www.xnview.com>) to manage your other multimedia files. With support for almost 400 file formats, you'd be hard pressed to find a file that this program can't handle. If you need to do more than just view your files, XnView lets you resize, edit, and apply effects to your images.

Image Eye. Image Eye (<http://www.fmjsoft.com>) has two versions: a freeware version and a full version, which costs \$24.95 and includes free upgrades. This image viewer is as simple as

can be, with no menus or toolbars. However, that's where the simplicity ends: You can index images, view thumbnails, run slideshows, rotate images, and adjust image characteristics, including contrast, brightness, and saturation. Image Eye lets you view various image file formats, including BMP, GIF, JPEG, TIFF, and PNG.

Of course, if you're running Windows XP, you already have two options for viewing images:

Windows Picture And Fax Viewer. WinXP users can take advantage of Windows Picture And Fax Viewer for viewing and managing their images. While browsing images in Windows Explorer, double-click the image and the image displays in the Windows Picture And Fax Viewer window. From here, you can scroll through your images,

watch a slideshow, increase or decrease the image preview size, print, save, delete, open the image in an image-editing program, rotate, and annotate images. With Windows Picture And Fax Viewer, you can view image files such as BMPs, JPEGs, TIFFs, GIFs, and PNGs. (Note that some files, such as Photoshop's PSD files, will open in the program that the file was created in instead of in Windows Picture And Fax Viewer.)

Microsoft Paint. Another built-in imaging program is Paint, which you can use to create or view images. Newer versions of Paint let you view several image file formats, including BMPs, JPEGs, and GIFs. As a drawing tool, you can create black and white or color images and save them as bit maps. In addition to creating or viewing images, you can print from Paint. ■

download times. However, when you compress a JPEG, the compression is lossy, and this loss of information can introduce artifacts (missing pixels, abrupt color changes) into the image. The smaller the JPEG becomes, the more the quality degrades. This makes JPEGs the wrong choice for images with sharp edges, such as lettering and line art. If your image has sharp edges and you save it as a JPEG, you're likely to see jaggies, or visible pixel steps along the image's edges, when you enlarge the image. Another drawback is that JPEGs don't support transparency or animation.

On the plus side, JPEGs support 24 bits of color per pixel. By taking advantage of the full color spectrum, JPEG is best for saving realistic images, such as photographs and naturalistic images. In addition, you can create progressive JPEG files, which are a series of image scans. During download, the first scan that appears is the lowest quality image, which is followed by higher quality scans until the highest quality image appears. JPEGs are used only for still images. Another file format, MPEG (Moving Picture Experts Group), is used for video.

GIF. This acronym is most commonly pronounced "jiff" (like the peanut butter), but it isn't unusual to hear it pronounced with a hard "G." No matter how you say it, GIFs (Graphics Interchange Format) are also used for Web graphics. However, unlike JPEGs, GIFs only support 8 bits of color per pixel, only 256 colors. This color limitation dictates the kind of images GIFs should be used for, such as images with solid colors or images with areas of uniform color.

The LZW (Lempel Zev Welch) compression technology used on GIFs is lossless, which makes GIFs well suited for line art, logos, and icons. The LZW compression technology has led to a few problems for GIFs, namely, the patent holder's threats to charge royalties. In response to these threats, several image developers came together to create a new patent-free image format.

This is where the PNG file format (discussed later) comes into play.

Other advantages that GIFs offer include support for one-color transparency and simple animation capabilities where multiple images embedded into a single file are displayed in a slideshow fashion, creating the look of animation. In addition, GIFs support interlaced images, which are similar to progressive JPEGs.

PNG. As a reaction to the attempt to charge royalties for LZW compression, several image developers created the PNG (Portable Network Graphics; pronounced "ping") file format. PNG is a patent-free format that supports 48 bits of color per pixel and, using lossless compression, compresses to sizes 10% to 30% smaller than GIF files. However, compressed PNG files are still five to 10 times larger than JPEGs.

Other advantages of PNGs include 8-bit alpha transparency, the ability to create effects such as glows, interlacing that's twice as fast as GIFs, and gamma

correction, where brightness and contrast levels are measured and adjusted for consistent viewing across platforms. In addition, you can display and print the same PNG image at different resolutions. However, PNG images don't support animation.

PNG was envisioned as a replacement for GIF. But with little support from major browsers, such as Netscape and Internet Explorer, PNG is taking longer to gain widespread support.

Keep 'Em Straight

Now that we've untangled a portion of the image file format acronym frenzy, you're better equipped to remember and keep them straight. The next time you see that three-character file extension at the end of your image files, you'll be able to decipher what kind of image it is. ■

BY DANA MONTEY



225dpi



72dpi

What's Your Size?

Image file size varies, depending on the format you choose for saving the file. Using Adobe Photoshop, we took the same 4 x 6-inch image and saved it at both 225dpi (dots per inch) and 72dpi in the formats listed below to see the differences in file size.

Image File Format	225dpi	72dpi
TIFF	3.48MB	374KB
BMP	3.47MB	364KB
PNG	1.84MB	209KB
GIF	685KB	77.7KB
JPEG (high quality)	163KB	42KB
JPEG (low quality)	69.5KB	25.4KB

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Have A Videoconference At Your Desk



TRAVELING FOR WORK IS OFTEN DIFFICULT. First you scramble frantically to get everything done in the office before you leave. There may be delays at the airport. You lose valuable work hours while on the road, and of course, hotel charges can add up for the company. For many small businesses, videoconferencing is a more cost-efficient way to meet and collaborate with colleagues. With recent dramatic drops in Web cam prices, videoconferencing is more affordable than ever. To set up a videoconference, you need only a few relatively affordable things: a Web cam, videoconferencing software, PC speakers, an Internet connection, and, if

one isn't built into your Web cam, a microphone.

Web Cam Prices Tumble

A few years ago, you could expect to pay more than \$150 for the most basic Web cam. Today, you can find many low-end Web cams for less than \$50, and most include extras such as built-in microphones.

There are a variety types of Web cams to choose from. At press time, Logitech (<http://www.logitech.com>) had two Web cams that each had an MSRP of \$49.95, the basic QuickCam Express and the QuickCam Messenger, which has a built-in microphone. Veo

(<http://www.veo.com>) has some of the most affordable videoconferencing devices. You may also see Veo's Web cams packaged under the company's previous name, Xirlink. Veo's Web cams start at just \$29.99 for the Connect and Stingray models. Creative Labs' Web cams (<http://www.creative-labs.com>) start at \$39.99 with the Web Cam Pro model, which has a microphone and autofocus capabilities. There are countless other brands and models from which to choose.

The right Web cam. Your Web cam needs a sturdy mounting device. Mounting stands with a rubber-coated base usually get the firmest grip on the top of your monitor. You need to secure your mounting device so your Web cam doesn't slide off the back of your monitor during a videoconference. Many Web cams' mounting stands have swivel bases you can adjust so you can properly position the camera.

Notebook Web cams generally have a mounting device that hooks over the screen of a notebook computer. Such mounting devices also work well for mounting a Web cam over a cubicle wall.

You may also want to consider the interface the device supports. Most Web cams today connect to your PC through a USB (Universal Serial Bus) cable. Some newer Web cams also use USB 2.0 or FireWire connections. Both allow faster connection speeds than USB 1.1. If you intend to videoconference over a dial-up connection, however, you don't need the faster technology because your Internet connection won't support such large data transfers anyway.

You should check for a few other things. Make sure the Web cam's cord is long enough so that it doesn't pull on the Web cam. A too-short cord could cause the camera to either slide off your monitor or gradually aim at the ceiling rather than your face. If you don't have a microphone (either external or built into your PC), buy a Web cam with a built-in microphone.

Finally, if you know what videoconferencing software you want to use, check the Web cam's compatibility with the software before you buy.

Find the ideal software. There are many videoconferencing software options, ranging from free Web cam

people in your company, select the software that best meets your needs. Plan ahead to determine how many copies you need and acquire all copies at the same time to avoid incompatibility problems later on.

Some software does little more than facilitate the transfer of audio and video signals. Other programs are tailored for meetings with special tools for collaboration. For instance, some programs have whiteboard support. This lets members view and edit a document during a videoconference. Other software will let users run programs from other conference members' computers.

The next consideration is whether you need full-duplex audio capabilities or whether half-duplex audio will suffice. Half-duplex software lets just one person speak at a time.

The first user must finish speaking before group members can hear anyone else speak. Full-duplex software lets people communicate as they would in real life, with overlapping communication and the occasional interruption. Just as multiple-user audio capabilities are important, multiple-user video capabilities also play a role in a videoconferencing experience. If you plan to videoconference with large groups, make sure you can indeed view an image from more than one user's Web cam at a time.

One of the most popular tools for videoconferencing has been Microsoft's NetMeeting. You can still download NetMeeting from Microsoft's Windows NetMeeting Web site (<http://www.microsoft.com/netmeeting>). However, Microsoft's Windows Messenger is quickly replacing NetMeeting. Windows Messenger is a part of the Windows XP OS. You can also download Windows Messenger 4.7 from Microsoft's WinXP site (<http://www.microsoft.com/windowsxp/windowsmessanger>). Both NetMeeting and Windows Messenger

include Web cam capabilities (both audio and video), as well as whiteboard and application sharing. Windows Messenger requires that you run WinXP. You also need a Microsoft .NET account. You can find more information about obtaining a .NET account from the WinXP site.

There are many other videoconferencing programs available, as well. For example, you can use Yahoo! Messenger 5.5 (<http://messenger.yahoo.com>), which is a free download. Other online services are available, too, such as Reality Fusion's TeamView (<http://www.realityfusion.com>), which lets three users talk at once. You can also view six people at the same time and include as many as 250 videoconference members. Fees apply for Reality Fusion's services, beginning at \$19.95 per month.

Set Up Your Own Conference

It is relatively easy to set up a simple videoconference. Before you do anything else, if you use a broadband connection, such as DSL (Digital Subscriber Line) or a cable modem and have a firewall, check your Web cam software's documentation to find out which ports need to be open. Many firewalls will block Web cam transmissions until you configure them appropriately.

Attach the Web cam. Read your Web cam's user's manual because specific setup procedures vary from camera to camera. Some manufacturers suggest plugging in the camera first and then installing the drivers and other software. Others suggest running the installation CD first and then plugging in the camera.

In most cases, install the drivers that came with your Web cam first. Insert the CD-ROM or floppy diskette in the appropriate drive. Usually, the setup program loads automatically. If not, right-click the Start menu, click Explore, and double-click the drive in which the installation disc or diskette is inserted. Find the setup file, which is usually labeled something similar to



There are many affordable Web cams available today. For instance, the Argus PC 300 costs \$29.99 and even includes a built-in microphone.

services to expensive, professional videoconferencing software. Many instant-messaging services, such as Windows Messenger and Yahoo! Messenger, support videoconferencing, as well.

In general, members of a videoconference must use the same software. There are some exceptions, however. Some newer software is compliant with the H.323 and H.324 standards, which let videoconference members use different software. If you want to use software that's different from the software that members of your group use, make sure that both groups use H.323- or H.324-compliant software. Check the software's documentation and specification sheet for information about the program's compliance with these standards. The best way to ensure compatibility among program features, though, is to use the same software.

Therefore, if you want to set up videoconferences with individuals outside your company, find out what software they use and consider buying or downloading the same program. If you only have videoconferences with

Setup.exe, and double-click to launch it. Next, follow any on-screen instructions or click the option to install the driver and then restart your computer. After your computer reboots, plug your Web cam into the appropriate port. Most cameras today attach to a USB, USB 2.0, or FireWire port.

Install the videoconferencing software. Next, install the videoconferencing software. Remember that all computers in a videoconference need to use compatible software. Either download the software or insert the program's installation CD-ROM or floppy in the drive. If the setup program doesn't start automatically, use Windows Explorer (right-click Start and click Explore) to locate the setup file. Double-click to launch it and follow any on-screen instructions to install the software. After you install the software, you may see a prompt to restart your computer. If so, restart the PC at that time.

Configure the software. If your Web cam doesn't have a built-in microphone, you should be able to use a microphone that's built into your PC (if it has one) or an external microphone. The videoconferencing software should have an audio setup utility you can run.

Setting up the videoconferencing software will vary from program to program. If you use one of the many instant-messaging services, such as Yahoo! Messenger, you will probably have to enable the Web cam feature by clicking a Web cam button or menu option. You may also need to enable the audio feature. The method of joining an existing conference or of viewing other members' Web cams varies. Read the program's users manual or FAQ (frequently asked questions) to learn how your program works.

Set up other PCs. Once you have set up videoconferencing on one computer, you should be able to easily set things up on the other computers. Remember that even though

videoconference participants may use different Web cams, they must all use the same software or software that is H.323- or H.324-compliant. Make sure compatible software is installed on all of the PCs that will participate in your videoconferences.

Configure your Web cam. You may need to make a few adjustments to produce the best video quality possible. First, you may need to focus the camera so your video is clear. Most



With a simple Web cam setup, you can use a service, such as Yahoo! Messenger, to have a videoconference.

Web cams have a small focusing ring around the lens that you can twist.

You may also need to adjust the resolution or frame rate of your Web cam broadcasts. Check your Web cam's documentation to find the supported frame rates and resolutions. You can change these settings in your videoconferencing software. Again, the procedure varies from program to program.

Setting the frame rate lower lets you send more detailed images, but they aren't refreshed as often. This can lead to a somewhat "choppy" video feed. As an example, a Web cam operating at 2fps (frames per second) may produce high quality video, but the video jerks because the camera captures just two images each second. On the other hand, a camera that captures 30fps will have videos with smooth movement, but if there isn't enough bandwidth to send 30 images every second, the camera will have to drop the resolution

so the images' file sizes are smaller. Resolution reflects the image quality of each frame. A Web cam with 640- x 480-pixel resolution sends frames made up of 307,200 (640 x 480) tiny dots, or pixels. A Web cam with 320- x 240-pixel resolution has frames with less detail because each frame is made up of just 76,800 (320 x 240) pixels. If you have a broadband Internet connection, such as cable modem, you may be able to send high-resolution video at high frame rates. However, if you have a dial-up connection, you will have to compromise between the quality of images and the smoothness of the video.

Even if you have a high-speed connection and a high-end Web cam, you may experience bad image or sound quality during a videoconference. Let's say you're having a videoconference with your colleague, Sue. She is using a dial-up connection and a 56Kbps (kilobits per second) modem. Although your PC is sending large quantities of video and audio data, Sue receives it through her slower modem line. As a result, the video quality on her end isn't as good as it could be. When her computer sends the video and audio data, her modem cannot handle large quantities of data quickly, so you'll see video that's either low resolution or has a low frame rate. The overall quality of video and audio, then, is determined by the videoconference member with the slowest Internet connection.

Ready To Meet

Most users don't realize how affordable and easy it is to set up an online videoconference. With rapidly dropping Web cam prices and a variety of videoconferencing programs, conducting meetings remotely is quite affordable and lets you visit business associates (or friends) from the comfort of your own desk. **II**

BY KYLEE DICKEY

Plugged In

Dig For Your Roots

Investigate Your Ancestry
At Genealogy.com

In many parts of the world, it's not uncommon for people to display a knowledge of their forebears that extends for centuries. In this country, perhaps because of our diminished sense of roots, it's more common for our sense of family history to reach back only as far as the memories of our oldest living relatives.

Rather than letting their ancestry remain shrouded in mystery, millions have launched investigations to uncover the roots and branches of their family trees. For most, genealogy isn't just a passing fancy, but an absorbing quest that lasts for years, even a lifetime.

Of course, it requires tools and know-how. But if the fire for tracing your family history has been kindled within you, Genealogy.com (<http://www.genealogy.com>) makes a good first step on your road to the past.

Plant Your Family Tree

Genealogy.com is an interactive, learn-as-you-go kind of site. This is obvious the moment you arrive at the home page. Although it features a handful of topical links, such as Today's Tip, the pale yellow data form that will get you started dominates the page. There's no mistaking what to do: Type your name and those of your parents into the entry fields and click the Go button.

After a few moments, you'll see these names laid out in a formal family tree structure, with four extra cells ready to accept the names of your grandparents. If you think this looks more like a typical PC program than a Web page, you're right. What you've just launched is actually an online version of Family Tree Maker, genealogy's best-selling software tool.

To add the name of a grandparent, click the appropriate cell. Rather than type the name directly into the cell, you'll find that clicking it opens another dialog box. Here you can input a bit of extra information, with data fields for date and place of birth and, if applicable, death. Across the bottom, four dropdown menus make simple work of expanding that person's immediate family, such as other children he or she may have had, as well as his or her own siblings.

Two items of note: Don't get so caught up in the past that you neglect to flesh out the present. When you click your parents' names or your own, an identical dialog box will open, so you can fill in the same

personal information, as well as add the names of brothers, sisters, even your own children.

Also, you no doubt noticed that the moment you added a grandparent's name, the cell sprouted a pair of additional cells for two of your great-grandparents. Fill in these, however, and you'll find that that's where the timeline stops. Why? Rob Armstrong, Genealogy.com's senior vice president and general

The screenshot shows the Genealogy.com homepage. At the top, there's a banner with a woman's portrait and the text "Discover your family story. Fill in the boxes to start your family tree, then search for ancestors with one click". Below this is a search bar with fields for "Name (First, Last)" and "Father's Name", with a "Go!" button. To the left, there's a "Quick Start" section with links: "Build your family tree", "Get special offers", "Top 10 things to do", and "Take a site tour". On the right, there's a "FREE TRIAL!" offer for "U.S. Census" and "World Family Tree", with a "Yours for 14 Days" button. A "Featured Products" sidebar lists "U.S. Census Selection - April 1850, 1860, 1870, 1880, 1890, 1900", "World Family Tree - Over 200 million actual family trees", "Your Family Name in 1910", "Family Tree Books", "Custom-made CDs", and "Digital Memories - Customized CDs".

The screenshot shows the Family Tree Maker web edition interface. It displays a pedigree chart for a family tree. The chart includes four generations: Great Grandparents (John and Mary), Parents (John and Mary), Children (John and Mary), and Descendants (John and Mary). A dialog box is open for the "Descendants" generation, allowing users to add details for each person. The interface includes a menu bar with File, View, Format, Search, Drive, Help, Options, and a toolbar with icons for Open, Save, Print, and Find. A "Tips" sidebar on the right provides advice on how to use the program effectively.

The Web Edition of Family Tree Maker lets you chart as many as four generations, with a dialog box for each so you can add details.

manager, explains that Family Tree Maker's online edition is designed for people who merely want to record information for their most immediate family. If your intention is to trace back beyond your great-grandparents, you really should use a more powerful program; the

logistics of this would get too unwieldy for an online application.

Help Your Tree Grow

As your online family tree takes shape, you can use its menu bar the same way you would if the program were running from your hard drive. Switch between viewing options to generate subtrees showing anyone's descendants and ancestors. Print the page or download the data to your PC (although you would need the full Family Tree Maker program to open it on your PC).

You can also save your tree on-site and return to it later. During this save procedure, you can sign up for a two-week trial site membership, which gives you free access to database content that's ordinarily available only by subscription.

Search for relatives. It's this extensive database content that can really unlock the past. By using the search engine accessible from the home page and your tree, you can hunt for ancestral names (filtered, if necessary, by birth

and death information). Search results may list links to a variety of sources in which the name has been located. Some, such as the Social Security Death Index, are free. Others, such as the World Family Tree and archival ship passenger and immigration lists, require subscriptions to view them.

You can consolidate many of these fees if you buy a site membership; just click the Shop tab on the home page. There you'll see three levels of annual membership, from \$69.99 to \$149.99; each includes the Family Tree Maker program.

But how can you be assured of getting the most out of one?

Live & Learn

Researching a family tree requires you to combine the skills of a private detective with those of a historian. You may have an aptitude for it, but there are many tricks of the trade to pick up on before you've mastered the process. Fortunately, Genealogy.com makes it easy for beginners to

benefit from the knowledge and experience of experts.

The Learning Center. When you click the Learning Center tab, you'll gain entrance to a well-stocked library of how-to articles. The blue bars divide everything into broad categories, such as tips on getting started, honing research skills, and understanding the numerous reference guides in which you might locate your ancestors.

At first glance, you might get the idea that each phrase under a category heading is an article unto itself. Instead, each of these is just a subcategory linking to several articles devoted to that topic.

Click the Getting Started bar and you'll see the way it breaks down, each of the five subcategories now opening to display its full contents. Under the first one, Begin Your Research At Home, five articles cover the earliest activities you should undertake, such as cataloging family stories and traditions.

Scan down the page and you'll see beginners' genealogy approached from several directions. Sometimes the information is applicable to your own circumstances, and sometimes the information is just fascinating reading, such as "They Changed Our Name At Ellis Island," an article by Donna Przecha, a debunking of the myth of immigrants' names being changed at Ellis Island.

These categories and subcategories comprise an enormous amount of hands-on information. It's far more than you can assimilate in a short time, so if you commit yourself to using it as a course of study, you'll likely be coming back here for months.

A classroom in a Web browser. Of course, not everyone is cut out to structure her own self-study program. If this sounds like your Achilles' heel, glance over at the Learning Center's left-side navigation bar, where you'll discover that someone has already done the organizing for you. And it won't cost you a dime.

Click the Free Genealogy Classes link and you can choose from three main

Tips For Using Genealogy.com

Another way to look at the Learning Center.

The Learning Center has a splendid library of educational articles, but if you're hoping to find an item on one arcane topic, the Center's hierarchical structure may prevent you from finding the info as quickly as you'd like. For a complete roster of all the articles, go to the Quick Start area on the home page and click Take A Site Tour, which opens a site map. Under Learning Center, click Genealogy How-To Articles. Now you'll see the library broken down into 19 specific

categories, with each article listed individually.

Take the real tour. When you click the aforementioned Take A Site Tour link, you'll probably notice that, well, it's not much of a tour. Much more in the spirit of a tour—that is, showing you how to use the site's features to their full potential—are several of the 10 stand-alone lessons found below the multipart courses in the Learning Center. These lessons will walk you through creating a personal home page, using the forums, and more.

Benefit from the research of others. You may share a common ancestor with someone who's already done extensive research that goes back generations. If you have a name for a relative who is otherwise lost to time, try plugging it into the search engine in the Family Home Pages section under Community. If it yields results, you can view the posted material containing that name. Who knows, you may have just found a branch of your family that you never knew existed.

courses of study: a 14-lesson introduction for beginners, a 31-lesson focus on using the Internet for research, and a 40-lesson course on tracing immigrants at various eras in American history. Below these are 10 separate short lessons that concentrate mainly on getting the most out of Genealogy.com itself.

All are organized and easy to follow, laid out in a slideshow format with Previous Page/Next Page commands (or buttons, as in Part I of the Beginner course). Not only do these lessons cover a lot of territory, but also they let you proceed at your own pace while maintaining a structural discipline.

Direct consultation. No matter how thorough your study material may be, sometimes there's no substitute for one-on-one feedback. If some genealogical matter has you stumped, click Ask An Expert. This will present you with two options.

First, you can try the site's resident expert, professional genealogist Rhonda McClure, who writes a regular Q&A

column. Call up her latest column under Rhonda Solves It; you'll find her email address in the bio beneath the column. Unfortunately, there's no guarantee your question will be one of the chosen few.

If you prefer more assurance than that, try your luck with other users of the site. Under the Message Boards heading, you'll see links to three major boards: Genealogy Events, Genealogy Tips, and Immigration. Genealogy Events is for workshops, conferences, and gatherings of genealogical societies, families, and other groups. The focuses of the Genealogy Tips and Immigration boards are self-explanatory, although we found that the Immigration link opened a page listing dozens of other boards, as well, rather than taking us directly to the discussion topics.

To post a question, you'll have to first register for a free account. You'll be prompted to do so the first time you click the Post New Message button above the boards. One of the bonuses

here is that you'll receive an automatic email notification when someone has replied to your question, saving you the need to repeatedly check the board.

Extend Your Connections

Like family life itself, genealogical research doesn't thrive in a vacuum. Alongside the Learning Center link on the home page, a couple of additional tabs will help you reach out to others for cooperation and assistance, and you can also easily share your own discoveries.

Community. Here's where you'll find it easiest to connect with others, whether you're related to them or not. Under Community, you'll find the primary access to GenForum, the site's message boards. Numerous home pages devoted to families and their trees-in-progress are headquartered here, as well as a link to get you started building your own page for the benefit of yourself and any relatives interested in following your shared roots.

And because nobody lives forever, the Virtual Cemetery is a unique photo collection of mostly vintage tombstones you can use for research.

My Genealogy.com. Genealogical research is a pursuit in which your resources and results quickly snowball, so it helps to have a centralized portal to help you manage everything. As a registered account-holder, return here to work on your family tree's home page, catalog photos posted for public viewing, and gain swift access to any databases to which you've subscribed.

Family Ties

According to an old saying, "You can't truly know who you are until you know where you've come from." Indeed, there's something illuminating about looking at a family tree and seeing yourself at the end of the funnel past generations formed.

Give it a try and see if you don't end up knowing yourself a little better. ■

BY BRIAN HODGE

Genealogy.com Fact Sheet

Although Genealogy.com may have only been launched in 1999, its heritage dates back several years. The site is closely connected to FTM (Family Tree Maker), developed by Banner Blue Software in 1989, but even FTM has its own ancestor. Banner Blue was founded in 1984 to develop and market Org Plus, a program designed to facilitate the creation and updating of corporate organizational charts.

Follow-up research revealed that a substantial portion of the customer base was adapting Org Plus for home use charting family trees.

Sensing an untapped market, Banner Blue expanded into products designed specifically for genealogical research; 14 years later, FTM is still the top-selling software of its kind.

The program's ownership has been less stable. In 1995, Broderbund Software bought Banner Blue. The Learning Company acquired Broderbund Software, and Mattel later bought The Learning Company. As a joint venture among Mattel, A&E Television Networks, and three other partners, Banner Blue evolved into Genealogy.com LLC, which eventually became a sole subsidiary of A&E.

And you thought families were complicated!

Because FTM has had its own Web site (<http://www.FamilyTreeMaker.com>) since 1995, you may wonder what's the point of maintaining two sites that look similar and share a certain amount of content. The senior vice president of the company, Rob Armstrong, explains the distinction this way: FamilyTreeMaker.com is a direct support site for the software, while Genealogy.com offers features that will be useful to genealogical researchers regardless of the methods they use to compile their findings. ■

Web Tips

Enhance Your Time Online

Flag Day Everyday

Come June 14, expect to see the Stars and Stripes flown high all around your neighborhood. If you're interested in putting a little more commitment into the celebration and want to brush up on your flag trivia, march right over to the World Flag Database (<http://www.flags.net>). You'll find more than 260 pages on flags from countries and international organizations with additional information on the country's formal name, capital city, area, population, currency, languages, and religions. History buffs will appreciate the new section on flags from history. And, of course, once you find your favorite flag, you can follow the link to buy it from the flag shop.

Moonlighting Money

Who couldn't use a little extra money (well, besides Bill Gates)? If you have some professional skills, grab your resume and shuffle over to Emoonlighter (<http://www.emoonlighter.com>). Four areas help match employers to talent: ITmoonlighter (programming, system admin), CREATIVEmoonlighter (writing, design, art), OFFICE-moonlighter (administrative), and BIZmoonlighter (business consulting). There's no charge for basic membership, but

Looking for a little work? Let Emoonlighter be your freelance agent. Post your professional profile and find that second income source that's right for you.

Emoonlighter takes a commission for the work you get through the site. Maybe you're on the other side of the fence: You don't have to be a big business owner to post a project you'd like to hire someone to do. Perhaps you need a personal Web site, legal advice, or engineering and architectural services. Just don't spend all that extra money in place.

The screenshot shows the homepage of Comicon.com. At the top, there's a banner for "THIS WEB PAGE IS PROTECTED BY THE COMIC BOOK LEGAL DEFENSE FUND" with a phone number 1-800-95-CBLDF. Below the banner, there's a large graphic for "COMICON.COM" with the tagline "GIGGLE, TITTER, LAUGH: THE WORLD'S BIGGEST COMIC BOOK CONVENTION". The page is filled with various news articles and links, including "CHARLTON AND YOUNG", "CHARLTON ARTISTS REUNITE", "NEW AGE MCCLURE", "CHARLTON PETERS' HOMECOMING", "CHARLTON PETERS' INTERVIEW", and "CHARLTON SELLER SPOTLIGHT". On the right side, there are columns for "CHARLTON NEWS & VIEWS", "CHARLTON ARTISTS REUNITE", "CHARLTON AND YOUNG", "CHARLTON PETERS' HOMECOMING", "CHARLTON PETERS' INTERVIEW", and "CHARLTON SELLER SPOTLIGHT". A sidebar on the left lists "ARTISTS ALLEY", "U.T.A.", "AGENCY", "DALLAS/FT. WORTH", "SACRAMENTO", "TAMPA", "DETROIT", "CHICAGO", "ATLANTA", "PHILADELPHIA", and "HOLLYWOOD".

You can find comic book artists, publishers, retailers, news, and more in the virtual halls of the online comics convention at Comicon.com.

How-To Know-How

The sad truth is no matter how many things we master in this life, there is always one thing that so confuses us we don't even know where to begin. Maybe for you it's cooking or home repair; maybe you just can never remember the rules to poker. Simple how-to instructions are one step away at eHow (<http://www.ehow.com>). You're

required to register (free) before you can access the 15,000 step-by-step instructions in 14 categories and 260 subcategories as diverse as parenting, auto maintenance, etiquette, and money management. This is a fantastic site to use as a first-stop when you just

The screenshot shows the Emoonlighter website. At the top, there's a search bar with placeholder text "Search Emoonlighter...". Below the search bar, there's a section for "User Stats" showing "1,000+ users", "100+ active users", and "100+ active projects". To the right, there's a sidebar with links to "Post a Project", "Find a Project", "Post a Profile", "Find a Profile", "Post a Job", "Find a Job", and "Post a Gig". The sidebar also includes a "How to Use Emoonlighter" section and a "Help Center".

Tucked in under the Moving & Storage tab (<http://www.homestore.com/move>) are a bunch of Realtor.com's strongest investigation tools. The Salary Calculator sums up the cost of living difference between two cities. The Moving Calculator estimates the cost of moving your stuff based on the number of furnished rooms. There are also local school reports and the Relocation Crime Lab. Don't be confused by the Homestore domain name; that's the name of the company that operates the site for the National Association of Realtors.

It's a Bird, It's a Plane, It's Online

Spider-Man, Daredevil, X-Men: The movie theaters today are filled with comic book heroes. Regardless of how well these flicks are made, do they make you long for the good ol' comics you read when you were a kid? Well, put on your nostalgia cape and fly on over to the mecca of online comics, Comicon.com (<http://www.comicon.com>). There you can track down a ton of information about comics past and present, probably more than Superman could lift (hmm, maybe not).

Plugged In

Compiled by Joshua Gulick

AllDorm

<http://www.alldorm.com>

If you thought your daughter's dorm room looked too small on orientation day, just wait 'til you move her in. AllDorm has hundreds of dorm-sized items you can use to stock her new cell, er, room. Browse the Futon w/ Mattress, Bookshelves, and BeanBag selections or check out the site's 40 Under \$40 department, which features inexpensive essentials, such as sheets and the popular Hi Mom, I'm Home laundry bag. AllDorm's other college survival must-haves include books on college life, posters, and a first aid kit.

Back To College

<http://www.back2college.com>

Don't let the kids have all the fun. If you're going back to college, visit this site to learn what's new at colleges today. The Web site offers information about the admission process and links to sites with financial aid tips. Sign up for a free newsletter or visit the forums to share experiences and questions with other adults preparing to re-enter college or attend for the first time. If you have a question that your peers can't answer, submit your question to one of the Web site's resident experts.

CollegeCarePackage.com

<http://www.collegecarepackage.com>

Don't let your college student struggle through finals week without these crucial staples: sugar, sugar, and more sugar. If you don't have time to pack a care package, stop by CollegeCarePackage.com and put together your own surprise. Pick the container (containers range from a cardboard boxes to messenger bags) and then browse the site and add items as you go. The site includes Healthy (ish) treats, as well as popular sweets and snacks. You can also find college supplies, books, and other small package stuffers. Don't overlook the site's collection of Little Thinkers.

College Savings Plan Network

<http://www.collegesavings.org>

If you're considering saving money for your child's college expenses, take a look at a 529 plan. The College Savings Plan Network, which is an affiliate of National Association Of State

find it online

Empty The Nest



Treasurers, offers a detailed explanation of 529 plan types. You can read the brochure in your browser or use Acrobat Reader (free at <http://www.adobe.com>). The site has links to College Savings Plan Web sites by state. Look at the FAQ for short answers to common 529 plan questions.

FastWeb

<http://www.fastweb.com>

Before you spend money on a fee-based scholarship service, visit FastWeb and see what you can dig up. FastWeb has a free scholarship search engine and a free college search engine on standard and secure servers. Once you fill out the questionnaire and register a login name, the search engine sends a list of scholarship opportunities or colleges. During the questionnaire, the site lets you opt out of its commercial email. You can read the Scholarship Success Stories to learn how other students found and received scholarships.

GoCollege

<http://www.gocollege.com>

If your college-bound student hasn't found the right school yet, send her to GoCollege. She'll find plenty of info about choosing a school and applying, and you'll find a detailed Financial Aid section and information for parents. The college search engine lets her search by test scores, class rank, tuition, or major. She can also listen to college radio stations while she peruses the tips in the Admissions Newsletter. If you're worried about campus crime, you can use the site's search engine (GoWhatever) to find statistics for individual schools.

MyRichUncle

<http://www.myrichuncle.com>

Planning for college means more than finding a respected school and appropriate classes. You may need to apply for loans and determine how you'll repay them. If you're not sure your first job will cover loans and living expenses, consider MyRichUncle. The system lets you get on your feet when you graduate. Instead of paying a traditional loan with interest, you pay a small percentage of your income for several years. Read Sally's Example to learn more about MyRichUncle's system and use the Valuation Engine to estimate your repayment rate.

That's News To You

Finding the appropriate Usenet discussion group to match your interests can be a monumental task. So each month, we scour tens of thousands of newsgroups and highlight ones that delve into popular topics. If your ISP (Internet service provider) doesn't carry these groups, ask it to add the groups to its list. This month we look for financial aid advice.

soc.college.financial-aid

Have a question about financial aid? If you don't find the answer at financial aid Web sites and you don't want to wait to talk with an expert, visit soc.college.financial-aid. College students and parents post questions and answers here regularly about topics such as losing financial aid eligibility and completing FAFSA forms. Although financial aid experts occasionally post messages here, most users speak from experience rather than expertise, so think of any response as friendly advice, not the final word.

soc.college.grad

If you are wondering whether you should get your master's degree online or go to a traditional school, you can look for advice in this friendly group. Pregraduate and graduate students post here, as well as students who have completed graduate programs. You can find information on topics such as preparing for the GRE, school rankings, and Ph.D. programs. Students often ask fellow users to help them decide which school to attend.

Share The Wares

Some of the best apples in the online orchard are the free (or free to try) programs available for download. Each month we feature highlights from our pickings. This month we pack PDAs (personal digital assistants) with software for school.

CollegeBoard.com Calculators

<http://www.collegeboard.com>

CollegeBoard.com provides information and calculators to students and parents to help prepare for college expenses. You can't download the calculators, but you can access them free at the Web site by clicking Paying For College, Financial Aid Calculators. The Web site has several calculators for students and parents. Keep in mind that some calculators require personal information, such as your family income. Collegeboard.com claims that your information is secure.

The Expected Family Contribution (EFC) Calculator lets you choose between the federal and institutional methodologies. If you think you know how much your student will make after graduating, you can enter it in the Student Loan Calculator to

Use Student Organizer 2 to keep track of classes, homework, and library book due dates on your Palm OS PDA (personal digital assistant).

compare it with your loan payments. You can also use the College Savings Calculator to estimate how much you will have by the time your student begins attending the school.

Student Organizer 2

<http://www.palmgear.com>

Many college students are dropping their physical assignment books for assignment programs that they can install on their PDAs. If your student takes a Palm OS device to class, download Student Organizer 2. The program lets her keep track of assignment due dates, library book due dates, and classes. She can also use



the Budget feature to track her spending habits.

Download the free trial version of Student Organizer 2 or buy it for \$2.99. PalmGear has two download options. You can download the software in a compressed format. (You'll need a decompression program, such as the free WinZip trial at <http://www.winzip.com>.) You can also use StreamLync, which is free at PalmGear, to download Student Organizer. StreamLync automatically installs the software to your PDA.

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System Overhaul

Your Computer's Worth Upgrading . . . Or Is It?

If you check out the Sunday ads from the big computer superstores, you know that prices for off-the-rack desktop systems have fallen over the last few years. Still, buying a new PC is a big investment in time and money for most consumers. So what happens when you spend time comparison shopping, buying, installing, and making yourself feel at home with a new system only to find out that its hardware, which was cutting edge in January, is heading out to pasture in June? There's no stopping the forward march of technology, but often we can perform upgrades to keep our computers in the running, at least in the areas that affect us the most.

The Pros & Cons Of Upgrading

Upgrades range in complexity from simple, 5-minute tasks to daunting, time-consuming, full-blown system overhauls. If you're uncomfortable opening your computer case, take heart: Upgrades that require the least amount of technical skill often make the biggest improvement in your system's performance. If you have the time, the will, and the patience to tackle more significant upgrades, you stand to experience an amazing improvement in your currently technologically challenged PC.

Assuming your current PC isn't meeting your computing needs, identifying those needs is key to mapping out what upgrades will help you the most. Some benefits are no-brainers. The cure for low hard drive space, for example, is adding a larger-capacity hard drive or a second internal or external drive. But some benefits

might not be as easy to anticipate. Increasing your computer's memory is usually the simplest, least time-consuming upgrade. It helps speed up your PC and improves its multitasking abilities. And swapping an old video card for a newer one with more video memory will improve graphic performance. Some video cards also include TV tuners and digital output for the latest flat-panel monitors.

Replacing your PC's old motherboard with a new one is the most significant upgrade you can make, akin to getting an entirely new computer. However, installing a motherboard is a heady task and often requires that you buy a new CPU, new memory, and maybe a new video card. This can be costly (sometimes more expensive than buying a whole new system) and time-consuming.

Is Your Computer Disposable?

If your computer is one of those off-the-rack superstore models we mentioned earlier, such as certain inexpensive consumer line PCs from eMachines and Hewlett-Packard, you might face additional roadblocks. Often these computers include proprietary motherboards with limited upgrade potential. Because of this, and because it's more cost-efficient to buy a replacement than to upgrade this type of computer, these PCs have earned the dubious nickname, "disposable computers." There's no harm in buying them, though, as long as you're aware of their limitations.

Regardless of the type of computer you have, check the manual that came with it to find out what areas are ripe for improvement. The next eight articles cover a



variety of upgrade topics, and you can find out how to replace a motherboard by reading our two-part "Mother Of All Projects" series in *Smart Computing*, in the April 2003 (pages 78 through 80) and May 2003 (pages 77 through 79) issues. If, in the end, you decide that upgrading your PC isn't worth the time or money, avoid the junk heap and look for donation and recycling programs in your area. You might be surprised to find that a computer that's frustrating for you is a gold mine for someone else. ■

BY CAL CLINCHARD

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Hardly Difficult

Upgrade Your Hard Drive

All too soon, our computers start to run out of hard disk drive space. And we thought that those drives were so huge when we bought our computers, too. "I'll never fill up a whole gigabyte!" claimed one unnamed computer writer.

When your Windows PC runs low on disk space, it may not let you install new applications. Win98/Me/XP may also offer to run Disk Cleanup to free more space.

Fortunately, now is a perfect time to treat yourself to a new hard drive. Hard drives cost less than ever before—often less than \$1 per gigabyte, compared to \$19.50 per gigabyte or more just five years ago—and their installation software makes upgrading much easier. Here's some guidance on how to buy a new drive and install it, whether as a replacement for your existing drive or just for room to grow. Subscribers, refer to our Web-only "External Drives" sidebar at (<http://www.smartcomputing.com/june03/harddrives>) for a simpler alternative to adding an internal drive.

Hard Questions

When you're ready to buy a new hard drive, the first thing to estimate is the capacity you want. You can get an OEM (original equipment manufacturer, here meaning bare and unboxed), name-brand 40GB drive today for as little as \$62 online. You'll pay more for a retail package with installation software, optional brackets, and a cable, but you should know that most manufacturers offer installation utilities as free downloads. A 40GB drive will have enough space for Windows

XP and an office suite, plus all the documents, spreadsheets, and email you'll accumulate for a while. However, it's worth an extra \$15 for an 80GB OEM drive or an extra \$43 for 120GB (more for retail drives), especially if you're an avid digital photographer, music file lover, or video-editing buff. Bigger is definitely better.

While we're on the subject of capacity, don't make the common mistake of confusing hard drive space with RAM or memory. Your hard drive stores data even after you shut off the computer. RAM reads data from the hard drive when your microprocessor needs it, but forgets it when you shut down your PC. Your RAM is probably measured in megabytes, such as 16MB, 128MB, or even 512MB, but your hard drive space is probably measured in gigabytes or in hundreds of megabytes.

As for brands, look for Western Digital, Maxtor, or Seagate drives. Samsung units manufactured within the last year are great values, too.

The hard drives in most desktop computers use the EIDE (Enhanced Integrated Drive Electronics) interface, which has aliases such as ATA (Advanced Technology Attachment), DMA (Direct Memory Access), UltraATA, UltraDMA, and IDE. The important part isn't which of these a drive claims to use (they are interchangeable), but rather the maximum speed your computer's EIDE interface can support. Even the fastest EIDE drives today, such as Hitachi's Deskstar 180GXP and

Maxtor's DiamondMax Plus 9, will run fine on a 66Mbps (megabytes per second) or faster interface, such as ATA/66, ATA/100, or Maxtor's Ultra ATA/133.

If your PC only supports ATA/33 (33Mbps) or a slower interface, such as PIO (Programmed Input/Output), it will read data more slowly than your drive can supply it. Consider buying an ATA/100 or ATA/133 PCI adapter card and cable (about \$35 to \$49; <http://www.promise.com>; <http://www.maxtor.com>) to get the speed you paid for. You might also need an adapter card if your computer's BIOS (Basic Input/Output System; the motherboard's fundamental hardware support) is too old to recognize a new hard drive's full capacity.

If you're interested in the "next big thing," and you're thinking about buying an adapter card anyway, take a look at an SATA (Serial ATA) drive from Seagate, Maxtor, or Western Digital and a SIIG SC-SAT212 adapter (\$49.99; <http://www.siig.com>). SATA drives use thinner, longer data cables that don't block the flow of cool air through a computer as do flat EIDE ribbon cables (you can buy round EIDE replacement cables, however). SATA has a slightly higher maximum speed than EIDE at



150MBps and even offers a little extra performance in everyday use, according to our tests. There isn't an overwhelming need to convert your computer to Serial ATA at the moment, but it may keep your PC more upgradeable as SATA drives become more plentiful than EIDE drives in the future. Pricier SCSI (Small Computer Systems Interface) drives are best suited for servers, not desktop PCs.

Speaking of performance, 7,200rpm (revolutions per minute) drives typically outpace 5,400rpm models and don't cost much more. The 7,200rpm drives spin their internal magnetic disks faster than 5,400rpm drives, so they can read, write, and find data more swiftly. On the other hand, a drive with an 8MB cache (memory chip that stores recently accessed data) instead of the typical 2MB may cost much more. At current prices, the performance gain from an 8MB cache may not be worth it unless you do a lot of photo or video editing. Finally, the lower a drive's seek time (time to find the right concentric track of data on a hard drive's disk(s)) or access time (time to find the first bit of data), the better.

Install A Replacement Drive

It takes more effort to replace your old drive with a new one, making it the boot drive (the drive containing the OS [operating system], such as Windows, that loads when you boot your PC), than to simply add a new drive. Your new drive will probably be faster than your old one, though, so your computer will run faster with Windows installed on the new unit.

We prefer to install a fresh version of Windows and our favorite applications when we replace a drive. However, if you'd rather copy Windows and everything from your old drive to your new one, you're in luck. The installation software available with new drives or by download from the manufacturer will probably let you do this. This way, you won't have to set up

your modem, Desktop, and preferences all over again.

In this section, we'll go step-by-step through replacing a drive and copying the old data from it, but be aware that the best instructions are the ones from your new drive's manufacturer. Use the software that came with your drive, or download it from the manufacturer, such as Seagate (<http://www.seagate.com/support/disc/drivers/dscwiz.html>). We downloaded Seagate's DiscWizard 2003 to help us install an OEM 120GB Barracuda ATA V EIDE hard drive with an 8MB cache. Our test PC had WinXP Home, a 667MHz Pentium III, 128MB of RAM, an ATA/66 interface, and a 10GB Maxtor hard drive. Our new drive was OEM, not retail, so we scrounged a fresh ATA/66/100/133 data cable from our hardware labs. Some computer stores sell cables for a few dollars, so don't overpay at a chain store.

Installation. Handle any hard drive as if it's more fragile than an egg and touch a bare metal part of your computer case every so often to dispel static. Back up your important data before you begin and then install DiscWizard 2003 by double-clicking

the file you downloaded (called Discwizard2003_en.exe in our case).

Shut off your computer and remove its side panel. Find your old hard drive and check its wide data cable connector to see which way its notch or red stripe faces. If a new cable came with your new drive, remove the old cable from the old drive and replace it. Make sure to connect the end connector, not the middle one, to your old hard drive. Connect the other end to the motherboard, unless you bought an adapter card. In that case, install the card according to the manufacturer's instructions and connect the other end of the data cable to it.

If your system only supports ATA/33 or slower, and you didn't buy an ATA/66 or faster adapter card, don't despair. You can still connect the new drive to the motherboard with the old cable, although the drive will be limited to about 31MBps. ATA/66/100/133 cables have 80 fine wires, as opposed to ATA/33 cables' 40 coarse wires. However, both types of cable have 39- or 40-pin connectors. Rounded cables cost a little more, but might help your hardware run cooler and live longer.

Keep Your Old Drive's Letters

You may have two or more partitions on your hard drive. Unfortunately, if you add a second hard drive with a primary partition, that drive will take drive letter D:, which will break the shortcut links to any applications on the first drive's later partitions. The secret is to partition the new hard drive with one extended partition and one or more logical drives (drive letters) within that partition, as shown in the lower example.

Second Hard Drive With A Primary Partition

C:	Old Drive, Primary Partition
D:	New Drive, Primary Partition
E:	Old Drive, Extended Partition (with one logical drive)
F:	CD-RW (CD-rewritable) Drive

Second Hard Drive With An Extended Partition

C:	Old Drive, Primary Partition
D:	Old Drive, Extended Partition (with one logical drive)
E:	New Drive, Extended Partition (with one logical drive)
F:	CD-RW Drive

If there is an empty 3.5-inch drive bay near your existing drive and your new data cable has a spare connector for a second drive, consider keeping your old drive around for a little extra storage after you install Windows on the new drive. You can add brackets from a computer store or the drive's

Hard Drive Repair Options

Hard disk drives are sealed units that are not meant to be repaired. Even microscopic dust particles can contaminate a drive and cause it to lose data, so manufacturers warn opening a drive's case will void its warranty.

Still, there are a few things you can do to troubleshoot a hard drive. If you suspect your drive is going wiggly, such as when you're seeing frequent error messages, download a diagnostic utility such as Seagate's SeaTools (<http://www.seagate.com/support/seatools>). After you install SeaTools on a floppy diskette and reboot your system with it, it can check most brands of hard drive for faults.

Check your drive's cable connections to make sure they're tight. Try a new data cable if yours is kinked or damaged. Try to mount the drive so that cool air can reach all sides of the drive. You shouldn't need to add special hard drive fans for 7,200rpm (revolutions per minute) or slower drives.

To gain more storage space without installing a new drive, run Disk Cleanup for each hard drive letter to get rid of unnecessary files. In Windows 98/Me, for instance, click Start, Programs, Accessories, System Tools, and Disk Cleanup. Uninstall applications you don't use and move those bulky graphics files (BMP [bit mapped]), JPG [Joint Photographic Experts Group], TIFF [Tagged Image File Format], and others) and music files (WAV, MP3, WMA [Windows Media Audio]) to external storage, such as CD-R (CD-recordable). Skip compression utilities, such as Win98's DriveSpace. They will gain you storage space, but they'll radically slow down your computer.

Finally, consider buying Partition Magic or Partition Commander. Both can repartition your hard drive without erasing your data. Smaller partitions have smaller cluster sizes, meaning they store data in finer chunks. The upshot is less wasted space and more room for your data. ■

retail kit to make a drive fit a 5.25-inch bay. Use the screws that came with the drive.

Check The Jumper

Before you physically mount the new drive in your computer, move its jumper (a small plastic block with a wire inside) to the position marked Slave on the drive's label or instruction sheet. You may have to use tweezers or needle-nosed pliers to pull the jumper out and insert it over the pins in its new position. While you're at it, make sure your old hard drive's jumper is set to Master. These settings let your computer know which drive is which; the master traditionally has the boot OS. We'll change the jumpers back later after we transfer Windows to the new drive. Some manufacturers set drive jumpers to CS (cable select), but this scheme to avoid moving jumpers to Master or Slave doesn't work in all PCs.

Carefully screw the new drive into the empty drive bay using four screws. Using fewer screws invites vibration errors, so don't cut corners here. Next, insert the middle connector on the data cable into the rear of the new drive, making sure the drive's notch lines up with the cable connector's bump or that the cable's red stripe faces pin 1 on the drive. Try to keep hard drives on separate cables from slower devices, such as CD-RW (CD-rewritable) drives.

Finally, insert a power connector in the new drive. If there aren't enough power leads to go around, you can use your CD drive's power cable temporarily for the new hard drive while you transfer the old drive's data to the new one.

DiscWizard. Start your PC. Shut down any applications that are running and then launch DiscWizard and click OK. DiscWizard will detect your new drive. Click Yes and Setup New Drive.

Click the checkbox affirming that the new drive is physically in your computer and then click Next. Make sure the new drive is highlighted. Ours was labeled [Slave] ST3120024A in the list, indicating the drive's model number and its slave status on the primary IDE channel (the EIDE cable with the lowest number). Click Next, Custom, and then Next again. We didn't have enough drive bays or power connectors in our tiny IBM PC 300, so we selected the new drive's role As The Boot Drive, Removing The Old Drive and clicked Next.

In the Custom Partitioning window, you can tell DiscWizard how to divide your new hard drive into partitions, or sections with different drive letters, such as D:, E:, etc. Splitting a drive into a few partitions will let Windows store more total data on it than would a single partition using the entire drive's space. It also lets you separate your OS from your applications and data or even install multiple OSes. As an example, our test PC could dual-boot, or boot to either WinMe or WinXP.

Click and drag the Size Partition slider to the size you want the first partition to be (we selected 4,902MB, or 4.9GB, for our WinMe partition) and click Set. Repeat this for the rest of the partitions you want. We made a 7,049MB partition for WinXP and a 108,087MB partition out of the rest of our new drive for our apps and data. Of course, if you make multiple partitions, don't forget to install new applications and save personal data to the non-OS partition's drive letter, such as E: in our example.

DiscWizard forced our 108GB partition to use NTFS (NT file system) because it was too big to efficiently use FAT32 (file allocation table, 32-bit). We could have switched to FAT32 by

making 34GB or smaller partitions or by later using a nondestructive repartitioning utility, such as Partition-Magic (\$69.95, <http://www.powerquest.com>) or Partition Commander (\$49.95; <http://www.v-com.com>), to convert the partition. Click Next twice when you're done.

DiscWizard will partition and format your drive and then copy the old drive to it. Accept the offer to print a detailed instruction manual and click Next. After the printout finishes, click Next again to shut off your PC. Set your new drive's jumper to Master and move it to the end connector on the data cable. Remove your old drive and set it aside. If you're keeping the old drive in the computer, change its jumper to Slave and move it to the middle connector on the data cable.

Finally, turn on your PC. We found to our chagrin that DiscWizard 2003 cannot properly duplicate a dual-boot drive, but you shouldn't have any trouble copying a drive with only a single OS. Third party utilities, such as PartitionMagic, DriveCopy (\$49.95, <http://www.powerquest.com>), and Copy Commander (\$34.95, <http://www.v-com.com>), can copy multiple-boot drives, by the way.



We couldn't fit a second hard drive in our IBM PC, so we temporarily set it up as a slave device while we copied the old drive to it using DiscWizard 2003. We borrowed our CD-ROM's power cable during the transfer.

Install An Additional Drive

If you want to keep your old hard drive as the boot drive and simply add the new drive as extra storage space with its own drive letter(s), follow the instructions above through the point at which you select Custom as the setup method. Click As Additional Storage and Next.

Click and drag the Size Partition slider to create one or more partitions as described in the section above and click Set and Next twice. We made one big NTFS partition using the entire drive. Click Exit when DiscWizard is done.

DiscWizard 2003 didn't give us the option to make a primary partition on the new drive, which would have let us install almost any OS later for a dual-boot system (some OSes, such as Linux, can install on an extended partition). Instead, DiscWizard made an extended partition on the new drive. Technically, a drive letter on an extended partition represents a logical drive. Unlike a primary partition, an extended partition can have several logical drives, each with its own letter.

The advantage to an extended partition on the second hard drive is that its first drive letter won't automatically

FDISK

If your computer runs Windows 98/Me or older, your new hard drive is on the smaller side (about 40GB or so), and you cannot get installation software from your new hard drive's manufacturer, you might resort to the DOS utility Fdisk.exe. You can find it on a Win95/98/Me system startup diskette. Use the Win98/Me version, as it supports FAT32.

Subscribers can read "Operation Storage," a step-by-step tutorial including Fdisk instructions, at <http://www.smartcomputing.com>. Click the Search All Articles box, then click the links for Master Index Of Issues, Learning Series, and PC Troubleshooting (the April 2003 issue). ■

become the drive letter D:, which would rename any extended partition drive letters on the boot drive and possibly disrupt any applications installed on them. See the "Keep Your Old Drive's Letters" chart in this article for an example.

Serial ATA Installation

New Serial ATA hard drives have similar installation procedures as EIDE drives, although SATA drives use different data cables and should require no jumper changes. Unless your computer has a very new motherboard, you'll need to install a SATA adapter card. Follow the instructions that come with the card.

Also, until new computer power supplies start to include special Serial ATA connections, you'll have to add a power cable converter to the drive. One may come with your new drive or adapter. ■

BY MARTY SEMS

For information on external drives, see our Web-only sidebar, "External Drives," at <http://www.smartcomputing.com/june03/harddrives>.

Don't Forget The Memory

The Most Cost-Effective PC Upgrade



When a PC starts running slowly, you may quickly blame your CPU or video card but don't overlook the system RAM. These chips store running programs and temporary information. Furthermore, they're the only components that can deliver data to the CPU for processing quickly enough to keep the CPU running at peak efficiency. RAM has an enormous effect on all aspects of a PC's operation, is incredibly cheap, and is easy to install, making it a prime target for upgrading once a computer begins to run slowly.

RAM & Performance

When physical RAM reaches its maximum capacity, Windows pages memory data to the hard drive using technology called virtual memory. Because the hard drive operates far

more slowly than physical RAM, the PC slows to a crawl once virtual memory kicks in.

Adding actual physical memory to the PC gives it more headroom before it has to switch to virtual memory. Extra memory lets you have more programs running simultaneously and lets you work with larger files, which is important now that so many of us are involved with more picture, video, and sound editing. By reducing or eliminating the need for virtual memory, everything from games to office software gets a dramatic performance boost, and multimedia files experience less stuttering and other problems.

Best of all, prices for the most popular types of RAM have steadily fallen. As recently as 10 years ago, memory cost \$50 to \$80 per megabyte. Today prices are as low as 8 cents per megabyte, making it possible to buy 512MB of RAM for a little more than \$40.

With RAM so cheap, the only remaining question is how much memory to add to a system. At this point, 512MB is ideal in a modern machine, although many Windows XP users like to use 1GB of RAM. In an older system, add as much RAM as you can afford and as much as the machine is rated for. Remember, Windows 98, Win98SE, and Windows Me generate error messages if you install 1GB or more of RAM, so stick to a number lower than that if you use those OSes. WinXP addresses as much as 4GB of RAM.

We Have The RAM

RAM comes in many formats and speeds. Pay attention to your motherboard's specifications when selecting RAM. The FSB (frontside bus) speed determines the maximum speed with which the memory banks can communicate with the CPU, and speeds are measured in megahertz.

You're going to want to buy memory that matches the motherboard's FSB speed. Most motherboards have two or more memory slots, and each is rated to accept a maximum amount of memory. Some don't recognize 512MB or larger chips, for example, forcing users to spread large amounts of memory among multiple slots.

Legacy RAM. Most PCs that were manufactured before 1997 use either FPM DRAM (fast page mode dynamic RAM) or EDO (extended data output) DRAM. It is tough to find these memory modules because they were phased out a long time ago, but sites such as Pricewatch.com (<http://www.pricewatch.com>) still list these units.

These types of chips use 30-pin or 72-pin SIMM (single in-line memory module) interfaces. The 72-pin chips have a notch in the middle of the row of contacts and are 4.25 inches long; the 30-pin chips don't have a notch and are only 3.5 inches long. They come in parity and nonparity formats, so buy the type that's compatible with your motherboard. Remember, too, you have to install SIMMs in matched pairs. For example, for 8MB of total memory, you must install two 4MB chips.

SDRAM (synchronous dynamic RAM). SDRAM and its successor, DDR (double data rate) SDRAM, are the most common types of memory used in PCs built in the past few years. Neither type needs to be installed in pairs, and in fact, you get a slight speed boost by installing a single memory stick with a high amount of memory rather than installing two or three chips with smaller amounts of memory.

SDRAM speed is measured in megahertz, just like CPU speed, and the most

Memory Repair Options

Memory is so fragile that there is no way to repair it if it becomes damaged, but you can head off most problems by keeping it cool. Make sure no cords or cables block airflow to the RAM banks and consider installing a heat spreader, which is a thin plate of metal applied to the RAM modules that is designed to dissipate heat. Adding another case fan that blows on the chips is helpful, too. Always protect RAM from electrical shock by keeping the computer grounded and connecting it to a UPS (uninterruptible power supply). ■

common speeds are 66MHz, 100MHz, and 133MHz (although faster speeds are available for special motherboards designed to handle it). Most 133MHz chips will work in a 100MHz motherboard memory slot, running at only 100MHz; if you plan to buy 133MHz RAM for a 100MHz motherboard (or vice versa), contact the vendor or manufacturer to make sure it's compatible with the motherboard.

DDR SDRAM operates at twice the speed of the SDRAM on which it's based. For example, a DDR SDRAM chip based on a 100MHz platform operates at 200MHz. These chips' names have nothing to do with their megahertz speed; a 200MHz chip is called PCI1600 memory, but they do correlate to the maximum memory bandwidth: PCI1600 = 1.6GB per second of bandwidth. Other popular speeds are 266MHz (PC2100), 333MHz (PC2700), and 400MHz (PC3200). Faster speeds appear every few months, but usually require new motherboards.

Standard SDRAM uses a 168-pin DIMM (dual in-line memory module) interface, while DDR SDRAM uses a 184-pin DIMM interface.

RDRAM (Rambus DRAM). RDRAM competes with SDRAM and uses either a 184-pin or 232-pin RIMM (which is not an acronym) interface. RDRAM is used in some Pentium III systems and many Pentium 4 systems and runs at various speeds, including 800MHz, 1,066MHz, and 1,200MHz.

All RDRAM slots on the motherboard must be filled, so you should usually install it in pairs (and some motherboards require that you install RDRAM in matched pairs). However, cheap C-RIMMs (continuity RIMMs)

without any memory are available to populate slots that don't have an actual memory stick installed. All the information you need to know about what goes where is in the documentation that came with your PC or motherboard.

When you're ready to buy RAM chips, there are plenty of online shops, and many of them have interactive memory configuration software that tell users which memory chips are compatible with their systems. We shop at the memory manufacturers' Web sites, with Kingston (<http://www.kingston.com>), Crucial (<http://www.crucial.com>), Viking (<http://www.vikingcomponents.com>) and Mushkin (<http://www.mushkin.com>) representing the cream of the crop.

Don't forget local retailers. Many times these shops are staffed with knowledgeable people who can help you avoid costly mistakes, and it makes returns easier if you end up with a bad RAM chip.

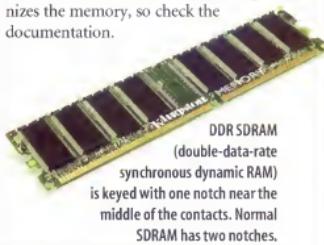
Memory chips come in antistatic bags because they're vulnerable to shocks; leave the chips in the bag until you're ready to install them. Discharge all static electricity before handling the chips. Use an antistatic wrist strap or touch a metal portion of the PC's case (when it's plugged in, otherwise it's not grounded).

When picking up memory chips, handle them by the silicon edges and never touch the metal contacts. If oil from your fingers is transferred to the metal, the contacts may corrode over time, rendering the chip useless.

To remove a chip, gently push the handles or clips on both sides of the slot outward and downward to eject the RAM. Make sure both handles on the

edges of the slot where you intend to add memory are open and gently insert the new memory chip in the slot. Insert EDO and FPM modules at a slight angle and "swing" into position until they click and lock. Insert SDRAM and RDRAM chips straight down into the slot and push firmly on both corners until the handles snap into place. Push toward the motherboard and don't wiggle the memory if possible.

All memory modules are notched so you can't insert them backward or upside down. SDRAM or RDRAM is seated properly when the handles on either side are upright and locked, with the plastic nubs sitting inside the notches cut into either side of the memory chip. If you install legacy RAM or RDRAM, make sure both memory modules are in the proper slots and that's it. You can put the case back on the PC and boot. If you have an older PC that uses DRAM, you may need to adjust the BIOS before the PC recognizes the memory, so check the documentation.



The Final Test

After the PC reboots, right-click My Computer (click Start and right-click My Computer if you use WinXP) and click Properties. Select the General tab and see if the proper amount of memory is listed in the Computer section. If it's not, turn off the PC and reseat the memory. If that doesn't work or there are many memory-related errors, consider returning the RAM. Otherwise, enjoy the significant speed boost your new upgrade provided. ■

BY TRACY BAKER

Improve Your PC's Reading & Writing Skills

Install An Optical Drive

Cs and optical drives go together like milk and cookies, peanut butter and jelly, Dagwood and Blondie. You can hardly have one without the other. If your PC doesn't have an optical drive, or if it has only the CD-ROM drive that came with it, you should consider adding a new optical drive. If you add a DVD-ROM drive to your PC, you can use DVD software and play DVD movies on your PC. Add a CD-RW (CD-rewritable) or DVD recordable drive to your PC, and you can copy a CD directly from your CD-ROM drive. Most optical drives are not very expensive, and they're practically essential for computing.

You have several kinds of optical drives from which to choose, and each has advantages and disadvantages. Let's take a quick look at the options so you can decide which drive is the best fit for you. We'll start with CD-ROM drives.

CD-ROM drives have been standard PC equipment for several years. Most retail software is stored on CD-ROMs, and of course, you can also play audio CDs in your PC's CD-ROM drive. The advantage of newer CD-ROM drives is that they're fast, with read speeds (the speed at which a drive can read data from a disc) as high as 56X (1X equals a read speed of 150KBps [kilobytes per second]), and CD-ROM drives are inexpensive, typically costing between \$25 and \$45. Chances are you already have one CD-ROM drive, so you probably don't need another. If you have an

older, slower CD-ROM drive and want to replace it, you should consider buying a DVD-ROM drive instead.

On To DVD Drives

DVD-ROM drives typically cost slightly more than CD-ROM drives, but DVD media can store much more data. A CD-ROM maxes out at about 700MB, whereas a DVD-ROM or DVD movie disc can store at least 4.7GB of data. DVD-ROM drives can read all the formats that a CD-ROM drive can. DVD-ROM drives usually have a speed of 16X and retail for between \$40 to \$70. DVD read speeds are nine times faster than CD-ROM drives (so 1X DVD equals 9X CD-ROM). Because of the design of CD-ROMs, a DVD drive usually reads a CD-ROM at about 48X.

Neither a CD-ROM nor DVD-ROM drive can record data to disc. To record, you'll need a CD-RW (CD-rewritable) drive or a DVD recordable drive. CD-RW drives cost more than DVD-ROM drives (anywhere from \$60 to \$145), but we think they're worth it. CD-R (CD-recordable) and CD-RW media is inexpensive, and you can store as much as 700MB of data on a single disc.

CD-RW drives have a variety of speeds. The fastest drives record data at 52X, rewrite data at about 24X, and read CD-ROMs at 52X. You may also

see drives with speeds of 48X/12X/48X (write/rewrite/read) or 24X/10X/40X. There are several configurations, but faster drives cost more.

Finally, we have DVD-recordable drives. There are two major recordable formats: DVD-R/RW (DVD dash R/RW) and DVD+R/RW (DVD plus R/RW). The two formats are not compatible, so if you have a DVD-RW drive, it won't write to a DVD+RW. There are a few DVD recordable drives that can record to both formats, such as Sony's DRU500A, but most drives are one or the other. You can use either kind of drive to create your own DVD movies that you can play in just about any home DVD player.

DVD-recordable drives are considerably more expensive than the other types of drives we've mentioned, but if you are into



v i d e o
editing at
home, they're
pretty nice to have.
Home or small busi-
nesses may also find them useful
because DVD recordable media can
store more than 4GB of data per disc.

However, the drives usually cost \$300 or more, a price that most users aren't willing to pay.

It won't take long to install a new optical drive, and it's fairly easy. All you need is a Phillips screwdriver and about 10 to 15 minutes.

First, before you shut down the PC and open its case, set the jumper on the new drive. If the new optical drive is the only optical drive you'll have in your PC, set the jumper to either Master or CS (Cable Select). Either will work, but to use the CS setting, you'll need a Cable Select-compatible ribbon cable. Most newer PCs and drives use CS ribbon cables, but if your system's a few years old, you should use the Master/Slave settings.

If your PC has an optical drive, check its jumper settings (you may have to unscrew the drive and pull it out to see). If the installed drive is set to Master, you can either set the new optical drive to Slave or Master and set the jumper on the installed drive to Slave. If the installed drive is set to CS, you can set the jumper on the new drive to CS. When you use the CS settings, your PC will automatically determine which drive should be the Master.

Park That Drive

Once the jumper is set, install the drive. Open the case and touch a bare metal part of the frame to discharge static electricity so you don't short out your system's sensitive components. Remove a drive bay cover from the front of the PC and slide the new drive into the bay. Connect the drive's audio cable to the audio cable connector, which is to the far left side of the drive (when looking at it from the back). Next, connect the ribbon cable to the back of the drive. If you already have one optical drive installed, the ribbon cable it's attached to should have a second connector. Use this connector for the new drive so both drives are attached to the same ribbon cable. Be sure to line up the connector correctly. The optical drive you're installing

should have a notched opening in the upper middle of the port that corresponds to a raised notch in the middle of the ribbon cable's connector. Line up the notch with the opening and gently but firmly plug in.

Now, power up the drive. Connect a cable from your PC's power supply to the power supply connection on the back of the drive. It's the last connection on the right side of the drive. The power supply connector only fits in one way, so you won't have any problems connecting it correctly.

Your optical drive should include a few screws with which you can secure the drive to the drive bay. If it didn't, you can buy them at a local computer store. Use the screws to secure the drive in the bay.

OK, we're nearly finished installing the drive, and it seems like we've hardly begun, right? You still have an audio cable hanging loose inside your PC, though. If your PC has a sound card, plug the audio cable into an optical drive port on the card. Almost all sound cards have more than one port for CD or DVD audio, so even if you have an optical drive installed, the sound card should accommodate another drive. Look for a connection on the sound card that is labeled Aux_In or CD_In. The audio cable should easily fit into the connection.

If your PC uses integrated audio (that is, the audio chip is built into the motherboard), your computer's motherboard may or may not have a secondary audio connection for an optical drive. If it does, it will be labeled Aux_In, just as it would be for a sound card. You may have to consult your PC's documentation to locate the position of the Aux_In connection. If you don't have a second audio connection for your optical drive, don't

despair. The drive should still be able to send audio signals through the ribbon cable, but the audio quality may not be quite as good. Decide which optical drive you want to use as your primary audio source and connect that one to the sound card.



The drive is now installed and ready to go. Good job! But we're not quite finished. You still have to install the drivers for the drive. Close your PC and turn it on. Your OS (operating system) should detect the new drive and install a basic driver for it. Pop the new optical drive's drivers CD into your CD drive, or your new optical drive if you want to give it a spin, so to speak. Windows will detect the drivers' CD and begin to install the drivers. Follow the on-screen instructions. Once the new drivers are installed, your drive is all ready to go. That wasn't so hard, right?

The new optical drive will increase your PC's functionality, especially when you add a recordable drive. It's hard to imagine the days when floppy diskette drives were the main means of reading and recording data to portable media. Now, it's hard to imagine a PC without an optical drive, or even two. ■

BY MICHAEL SWEET

See our online sidebar, "Quick Troubleshooting Tips," at <http://www.smartcomputing.com/june03/opticaldrives> for information on troubleshooting your CD drive.

The Brains Of The Operation

Upgrade Your CPU

With minimum system requirements for programs on the rise and hardware prices in retreat, upgrading a computer's CPU seems like a tantalizing option. The CPU is the "brains" of the computer, rapidly executing instructions from hardware and software.

The faster and more efficiently it handles these operations, the better the PC runs, but when it comes to upgrading, CPUs are perhaps the most misunderstood of all computer components.

In 1965, Intel's co-founder Gordon Moore predicted that the number of transistors per square inch on integrated circuits would double every 12 months. What has since been referred to as Moore's Law has held true to this day,

although the time frame has been modified to 12 to 18 months. Because of this doubling of transistors, we also see a doubling of the amount of information stored on the chips, which loosely translates into a doubling of processor speeds every 12 to 18 month. That's why every time you buy a computer, it seems like the new models are twice as fast in no time. That wouldn't be a problem if it were possible to pop in a newer CPU every year, but it rarely works that way.

CPU Complexity

CPUs are complex components; they don't all interface with motherboards in the same way, which is a big problem with upgrading. By the time you find a new processor worth upgrading to, it won't work with the motherboard on which your current CPU is installed. There are adapters called "slosets" that let end users use socket-based processors in a slot interface, but they're quickly disappearing. In most cases, jumping from one generation of CPU to the next requires that you also replace the motherboard.

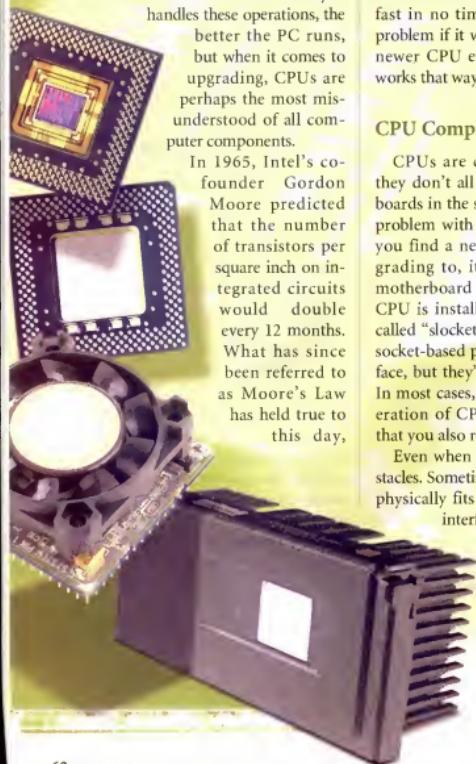
Even when it doesn't, there are obstacles. Sometimes, the newer processor physically fits the older motherboard interface but requires a higher voltage than the motherboard provides. Sometimes, you can rearrange plastic jumpers or use the motherboard's BIOS (Basic Input/Output System)

interface to modify the voltage, but it depends on the motherboard's make and model. Contact the motherboard or PC's manufacturer to determine what processors it's compatible with and what equipment you need. Check at AMD (<http://www.amd.com>) or Intel (<http://www.intel.com>) for CPU specifications and other information.

Depending on the CPU, the computer's power supply may pose problems. Modern processors, such as the AMD Athlon XP, have specific power supply requirements, so make sure the one in your system meets or exceeds those standards or you'll have to buy a new power supply, too.

FSB (frontside bus) speeds are another consideration. The FSB is the main interface the processor uses to send and receive data to and from the PC's RAM; FSB speed is measured in megahertz. Standard FSB speeds for older Intel or AMD processors are 66MHz, 100MHz, and 133MHz. Newer processors (the AMD Athlon XP with its 266MHz or 333MHz FSB speeds and the Intel Pentium 4 with its 400MHz, 500MHz, or 533MHz FSB speeds) use faster buses. Processors operate at multiples of the FSB speed (called a "multiplier"); make sure your motherboard can handle the speed of the newer CPU or has a different FSB speed you can select. Select a different FSB by rearranging jumper blocks or modifying BIOS settings. Most slosets let users modify voltages and FSB speeds, but for most users the expense and hassle isn't worth the effort. Note that FSB speed isn't the same as CPU speed, but both are measured in MHz.

There are many things to be aware of when buying a CPU, especially deciding between a boxed retail and an OEM (original equipment manufacturer) model. Retail CPUs are usually packaged with everything you'll need for installation, including instructions. They have 1- to 3-year manufacturer warranties, just like any other consumer product. They cost a bit more than their OEM counterparts, but are worth every



penny for the reduced installation hassles and added peace of mind.

OEM processors (also called "tray" or "white box" CPUs) are intended for computer manufacturers, such as Dell and Gateway. They generally have only a 30-day warranty, and they don't ship with heatsinks and fans, required to cool the processor. Popping an OEM processor directly into a system without adding any cooling accessories is a good way to cause a meltdown, and we'll talk about that momentarily.

Reputable resellers label products as boxed retail or OEMs, so look at product descriptions when you order. If you're not sure, contact a company representative or look for a manufacturer part number in the product description. Boxed retail Intel Pentium III and Pentium 4 CPUs, for example, have part numbers that begin with BX, and OEM versions start with RB. Boxed retail Athlon XP processors have part numbers that end with BOX.

Keep It Cool

If you buy a processor that doesn't come with cooling accessories, you'll need a heatsink and perhaps a CPU fan (go with what the CPU manufacturer recommends). Heatsinks are made of aluminum, copper, or other metals that conduct heat well. They sit on top of the processor to suck up and dissipate heat, usually with the help of grooves or fins that expose more surface area to the cooler air circulating through the PC's case. Some processors can get by with one heatsink, but most also need a small fan that helps move hot air away from the heatsink so it can operate more efficiently. Most CPU cooling kits contain both heatsinks and fans.

There are hundreds of heatsinks and fans available online and in computer shops, so get models that are designed to work with your processor. Cooler



The large open slot on the left is where the processor slides in.

Note the guide rails on either side of the slot.

The black plastic strip to the right of the slot is a retaining clip—a separate piece of plastic is added to it once the processor is seated that sits between the fins in the heat sink to help secure the unit.



Master (<http://www.coolermaster.com>) and Thermaltake (<http://www.thermaltake.com>) offer kits for all processors.

Heatsinks sit atop the CPU core, and although the metal on those components looks smooth, you must apply a layer of thermal paste or thermal tape to make an efficient seal. Ask if your heatsink comes with its own thermal tape; if not, buy a good thermal paste (also called thermal compound or thermal grease) when you buy the heatsink. If you have problems, it's harder to remove a heatsink if you've used thermal tape, but tape's better than nothing. Opt for the paste if possible.

When choosing a CPU cooling method, you have to consider size. Look at the area around the CPU slot or socket to make sure there's enough clearance to accommodate a heatsink. Some heatsinks are large, so check the dimensions, ensuring it won't touch other components on the motherboard.

When you get the new CPU, keep it in its packaging until you are ready to install it and always handle it by its edges, never touching any metal. Turn off your PC, remove the case, and touch a metal portion of the case to discharge any static electricity in your body. Leave the PC plugged in when you do this to make sure it's grounded. You can also buy an inexpensive grounding strap for your wrist; it'll protect delicate components from static electricity jolts.

The process for removing the existing CPU varies. In a slot-based system, there

are retaining clips on either side of the processor cartridge. Press both of them inward and gently rock the cartridge out of the slot (disconnect any fan power connections first).

On a socket-based system, carefully remove the heatsink unit. On old socket-based systems that use LIF (Low Insertion Force) interfaces, you may need a chip puller (available at most computer stores) to gently work the processor out of its socket. Don't force it or you may bend a pin, destroying the old processor or damaging the motherboard interface. Newer socket-based interfaces use ZIF (Zero Insertion Force) to remove the CPU once you've unlatched the locking mechanism. Pull the lever, which lifts the chip up and out of the socket.

CPU Repair Options

If the CPU goes up in a puff of smoke, you can't repair it, but you can try to prevent that sort of thing from happening. Heat is a CPU's main enemy, and random system lockups that require a reboot are the surest sign that the CPU may be overheated. (Many are designed to shut down when the temperature gets too high.) Get a bigger or more efficient heatsink and fan and make sure air flows freely through the computer by moving cables or other components that block the intake or exhaust ports. ■

Now, insert the new processor. For slot-based processors, install the heatsink module if it isn't already attached and install any guide rails if the processor has them. Press the entire unit into the slot until the retaining clips pop into place. If you have a socket adapter, install the processor and then insert the slot interface according to the instructions. When placing a processor, such as an Athlon XP or Pentium 4, in a ZIF socket, handle its edges; never touch the pins or metal components. Align the chip properly or the pins won't fit in the socket. Each processor is "keyed" so it fits in the socket only when properly aligned. If the pins on the bottom of the processor don't slide into the holes in the socket when you apply gentle pressure, realign the processor and try again. Completely open the lever on the side of the socket. Once the processor is settled in, lower the lever until it snaps into place.

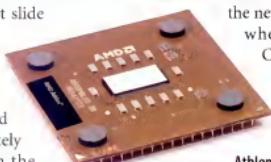
Install the heatsink and/or fan when the processor is seated. If your heatsink has thermal tape, peel the plastic off of one side, stick the tape on the processor, and peel the plastic off the other side so it sticks to the heatsink. The tape isn't sticky, which makes it possible to nudge the heatsink into position more easily. It creates a permanent seal once the processor heats it. If you use thermal paste, apply a paper-thin coat. Put a drop on the CPU, set the heatsink on top, and let the pressure spread the paste. Wipe off excess paste with a lint-free cloth, especially if you use a product that contains silver.

Mount the heatsink according to the instructions, but don't use too much force. Pressing too hard on the CPU can break it or your motherboard. If the heatsink uses plastic clips, too much pressure snaps them off. You can use a small screwdriver to nudge clips in place, but don't do this unless you have to. One

slip could scratch or crack the motherboard or another vital component.

When the heatsink's in place, you're finished. Make sure no cables or components were disturbed and adjust the motherboard if it has DIP (dual in-line package) switches. Replace the case cover, boot your PC, and enter the BIOS interface if you need to adjust voltage or FSB speeds. When Windows boots, right-click My Computer (or click Start and right-click My Computer if you use WinXP), click Properties, and select the General tab. Windows reports your newer, faster CPU speed, and you should test your programs and run other benchmarks for an hour or so to make sure the new CPU doesn't overheat when stressed. (Most P4

CPU's will automatically shut down when overheated.) If the heatsink or motherboard came with a heat monitoring utility, use it to make sure everything is running nice and cool.



Athlon

XP processors are socket-based and require a heat sink or heat sink/fan combo for proper cooling.

Should You?

Now that you know how to upgrade a CPU, only one question remains: should you? For most users, the answer is no. There are easier and more cost-effective upgrades. CPU upgrades are good if you play the latest computer games or multitask all the time. The problem is, dropping in a CPU twice as fast as the one it's replacing doesn't make the system run twice as fast. You'll have to consider other potential bottlenecks, such as RAM, hard drives, and video cards. Many processor upgrades require a simultaneous motherboard upgrade, which increases the expense and hassle. Unless you can swap in a newer, cheap CPU, try to hold out for a new system and spend the money on memory or a new hard drive instead. ■

BY TRACY BAKER

Interface Alphabet Soup

Shopping for processors can be intimidating because of the myriad interfaces from which to choose. There's Socket 1 through Socket 8, Slot 1, Slot 2, Slot A, FC-PGA, SECC, OOI, and the list goes on. Many of these are just different names for the same thing, but the many interfaces that do exist are incompatible with one another, and some interface arrangements use different "packages." For example, the Socket 370 interface originally used a PPGA (plastic pin grid array) package but later was upgraded to a newer FC-PGA (flip chip pin grid array) package, so not all Socket 370 processors are alike. That said, here's a quick rundown of the most common interfaces you'll see and the processors to which they apply.

Slot A

AMD Athlon

Slot 1

Intel Celeron, Intel Pentium II, Intel Pentium III

Socket A

AMD Athlon, AMD Athlon XP, AMD Duron

Socket 1, Socket 2, Socket 3

Intel 486 family

Socket 4

Early Intel Pentium (60MHz, 66MHz)

Socket 5

Intel Pentium

Socket 7

AMD K5, AMD K6, Intel Pentium

Socket 370

Intel Celeron, Intel Pentium III

Socket 423

Intel Pentium 4

Socket 478

Intel Pentium 4

Super 7

Technical upgrade of Socket 7 that supports 100MHz FSB and all Socket 7 processors



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Disappointing Sights & Sounds?

Consider Upgrades To Your Audio & Video Cards

An axiom in upgrading a PC is this: What's inside the PC is at least as important as what's outside. For sound and video, spending big money on a monitor or speakers cannot overcome the components that drive them—the video card and sound card, respectively. Before spending money on the outside, spend less money, often to greater effect, on the inside. Upgrade your video and sound card, and you might find that you don't need that new monitor or speakers.

Seeing Is Believing

When upgrading your PC, get the most bang for your buck by buying more RAM, a bigger hard drive, and a better video card. Adding RAM speeds up everything. The bigger hard drive adds to the computer's performance but more significantly improves your own, by cutting the annoyance of having to periodically clean up your hard drive. Many users ignore the third element because upgrading a video card doesn't seem to have an obvious payoff. With a halfway decent monitor, the reasoning goes, you won't see much of a difference no matter what your machine uses to power it.

A new video card is especially important if you're interested in using video applications, advanced graphics applications, or games. Game developers push the limits of computer technology, and today's games place

enormous demands on your hardware. Video applications require decent video cards for playback, but if you intend to create video, you need a card with the latest technology. Graphics designers know the importance of strong video (it's one of the reasons that graphics professionals have preferred the Macintosh over the years); precision and accuracy are paramount in that field. For all three applications, speed is critical, and like computers themselves, video systems get faster with each generation.

Before buying a new video card, think what you want to do with it. If you want a card designed specifically for gaming, get one that advertises gaming features. If you intend to use your PC as a television and VCR, get a card with a TV tuner and recording capabilities. And so on. Here we'll outline some specific uses and show you what to look for once you've determined those functions.

Productivity. Productivity applications may be unglamorous, but they occupy most of the hours users spend on their PCs. These apps are largely ignored in the advertising and commentary about video cards. Let's reverse that and place them first. You need a video card that delivers crisp, clear text in order to avoid eyestrain and headaches. You also need a card that offers multiple screen resolutions, so you can adjust according to the application you're using. For graphics applications on a large monitor, you'll want high resolution, possibly up to

1,920 x 1,440, but certainly 1,600 x 1,200, with all resolutions offering 32-bit color quality.

Gaming. A gamer's card offers strong 3D support and at least 64MB of video RAM. Video RAM is extremely important because games demand the constant redrawing of the screen at high speeds, and video RAM is designed to handle these high-speed needs. Other desirable features include strong support for the highest color quality at the highest resolutions and support for 3D features such as alpha blending (to simulate translucence), bump mapping (to simulate bumps and wrinkles), fog (to simulate fog, of course), and per-pixel shading (for sophisticated lighting effects). Video cards vary significantly in these capabilities, but most new video cards in the \$100 to \$150 range give you decent 3D unless you demand only the most advanced views of the most advanced games.

Television and VCR. If you want to use your PC to watch television and



record your favorite shows, look for a video card with a TV tuner and programmed recording options. The classic is ATI's All-In-Wonder series, but Matrox's G450 eTV card offers strong features, as well.

Look for cards with PVR (Personal Video Recorder) features, such as time-shifting, which lets you pause a TV show while you're watching it and return to it later to pick up where you left off. You also want standard VCR programming features, and the ability to burn shows onto CDs or DVDs to watch them on other PCs or on your standalone TV.

Digital video, DV (digital video) is the most demanding task a PC can face. Accordingly, video cards that let you capture and manipulate digital video require special consideration. First, if you want to connect a digital monitor to your system, you need a DV port on the video card, something many of today's cards provide. If you're into serious digital video, you'll need a digital camcorder and a way of transferring the data from camcorder to PC quickly. Transfer via standard USB is unacceptably slow; for this purpose, you will probably want USB 2.0 or FireWire (also known as IEEE 1394). Some video cards include a 1394 port, but you can buy separate PCI (Peripheral Component Interconnect) cards that give you multiple 1394 or USB 2.0 ports.

Dual display. If you have two monitors, buy a card with two monitor ports. Once almost exclusively the province of Matrox cards, many different video cards, including NVIDIA and ATI cards, now offer the dual display feature. Typically one of the monitor ports will be standard 15-pin VGA (Video Graphics Array) and the other

a DVI port (for LCD monitors), but the package will also include an adapter so you can attach two VGA-type monitors without an LCD. You can set the monitors to display the same desktop, or you can split the desktop across the two.

The top-of-the-line \$449 ATI All-In-Wonder 9700 Pro has a 125-channel TV tuner, video capture features, and PVR (personal video recorder) capabilities.

Hearing Is Believing, Too

Great sound is extremely nice to have, and in fact essential for certain uses. Many games would provide a poorer experience without sound (although few rely on sound), and for any application involving music, sound becomes critical. If you use your PC extensively to play CDs or MP3s or to watch DVD movies, you'll want the best sound card you can afford. And if you're an amateur musician who uses his PC as a music-recording studio, the quality of the sound is crucial.



You can, of course, buy decent sound cards for half the cost of the Creative Labs Sound Blaster Audigy 2 Platinum (\$199.99), but we are pretty fond of the Audigy 2.

Sound cards are less complex than video cards, but you should still look for several features when buying one.

RAM. As with everything else in PCs, the more RAM, the better. The memory on a sound card is dedicated

to moving sound into and out of the computer, and in doing so, it frees up the CPU for other computing tasks.

Support for 3D and surround sound. You've run out and bought those great new surround-sound speakers, plugged them in, and waited

to be held in thrall by the stunning, swirling, all-around-your-head sounds. Nice idea, but the speakers are only as good as your sound card; if the sound card doesn't support surround sound, the speakers won't give you the effects you want.

Sound cards can support 3D audio and surround sound. Although separate technologies, they're often confused with one another because they offer similar effects. 3D audio refers to the ability of the sound card to send adjustments to the speakers to make the speakers sound as if they're farther apart than they are. The computer industry introduced 3D audio because most users' computer speakers are usually placed close together, typically on either side of the monitor.

Surround sound is also known as 5.1 or six-channel sound. The 5.1 nomenclature refers to five channels of located sound (left, right, center, plus separate additional left and right channels) and one bass channel through a subwoofer. A few sound cards have appeared with 7.1 capabilities, including a \$109 USB version of M-Audio's Sonica Theater. These cards include software that simulates the surround experience using only the standard two stereo speakers, or a 2.1 setup (two speakers and a subwoofer), but we think it's best experienced with one speaker for each channel.

Recording. If you're a musician, you can quickly and inexpensively

turn your PC into a multitrack recording studio. You'll need a good sound card; a sub-\$100 software package, such as Magix Music Studio (<http://usa.magix.com>) or Cakewalk Music Creator (<http://www.cakewalk.com>); a decent microphone; and the instruments you already own. The center of this system is the sound card, but you don't need to break the bank to get the quality you need. You can buy a high-end card, such as Creative Labs' Sound Blaster Audigy 2 Platinum eX, which gives you external connectors and several software packages for recording, but any card, even in the sub-\$50 range, will suffice as you get started. As you gain experience and develop specific recording needs, you'll discover products from companies such as Edirol (<http://www.edirol.com>) and Tascam (<http://www.tascam.com>)

that act as external interfaces to your sound card, and some that include their own sound cards for high quality multitracking functions.

Install Your New Card

Most video cards today use the AGP (Accelerated Graphics Port) interface instead of the older PCI interface. But to use an AGP card, you need an AGP slot on your motherboard; if you don't have one, you have to look for a PCI card. Sound cards mostly come in PCI versions.

Before beginning, go to the support area of the card manufacturer's Web site, locate the drivers' section (support or downloads), and download your new card's most recent driver. That way, when you install your new card you can immediately update its driver and maximize its capabilities.

Maintain & Troubleshoot

To most effectively maintain your video or sound card, visit the manufacturer's Web site regularly and download and install the latest drivers. New drivers fix problems that users and the company's engineers have discovered. They also frequently add new features for the card, including new control software and support for additional monitors or sound peripherals. Eventually these drivers will be posted to Windows Update and thus be downloadable automatically when Windows prompts you, but frequently the drivers you'll find posted at Windows Update are not the latest available.

If your monitor is acting up, make sure the

cable is connected to the card properly and the card is seated securely. Open Display Properties from Control Panel (click Start, Settings, and Control Panel) and, on the Settings tab, make sure the resolution and color quality are what you want; click the Advanced tab and make sure your PC is using the correct video card and monitor drivers. For sound cards, double-click Sounds & Audio (or Sounds & Multimedia) in the Control Panel and ensure the correct drivers from here. Also in the Sounds applet, make sure you're listening to the sound through the correct card. This is important if you have two sound

cards, as happens when you add a PCMCIA sound card to your notebook or when adding a sound card to a system that also has integrated sound.

To see if your monitor or speakers are causing problems, try them on another PC or reinstall your old card and see if the monitor/speaker problems persist. If they do, then the problem does not lie with the card.

Finally, clean out your PC's case (dust affects everything). If it seems extremely hot, buy a cooling fan. Inexpensive and powered by the computer itself, cooling fans can save you from all sorts of computing misery. ■

Next, uninstall your current driver to prevent any possible driver problems on reboot.

Power down, remove the cover from the case, and ground yourself (touch a metal part of the case) to discharge static electricity (make sure the PC remains plugged in, or it won't be grounded). Locate your current video or sound card, remove the screw that holds it in the case, and put the screw where you'll be able to find it. Lift the card out of the slot, gently rocking it to loosen it, and push the new card into an empty AGP or PCI slot, whichever the card is designed for. When the card feels secure, fasten it with the screw, and then close the case. Plug the monitor cable into the VGA or LCD ports on the video card or the speakers into the speaker port of the sound card and turn everything on.

When Windows boots, it will attempt to install the new driver. In the case of a video card, because it cannot use the driver that's currently installed, it defaults to the Standard VGA driver, with a display set at a resolution of either 640 x 480 or 800 x 600, with either 16 or 256 colors. To complete your installation, let Windows install the new driver automatically (Windows XP is especially good at this) or, if you've downloaded a driver from the manufacturer's site, install it manually yourself.

When you're ready to install a driver, wait for Windows to prompt you to search for a driver and tell it not to search, letting you locate the driver yourself. Browse to the folder containing the driver you've already downloaded and let Windows install it. WinXP users may have an extra step, confirming that they will allow the installation of an "unsigned" driver (one Microsoft has not yet officially accepted). This is the case with most new drivers. ■

BY NEIL RANDALL

Fire Your Printer

New Printers Let You Create Photo-Quality Images At Home

Sometimes upgrading one device means upgrading two. Your 6-year-old inkjet printer may be running smoothly and printing decent text documents at a slow, if steady, 4ppm (pages per minute), but it can't compare to inkjet printers on today's market. If you aren't interested in speed and you print mostly text, there's probably no reason to upgrade.

If, on the other hand, you recently bought a digital camera, you already know that your printer can't produce the picture quality images you see on your monitor screen when you look through your digital photos. Like many other electronic devices, printers often become obsolete before they break.

Read The Label

Manufacturers describe printer resolution in dpi (dots per inch) and print speed in ppm. Pay attention to printer speeds; most have separate speeds for black ink and color printing. Resolution is important, but don't get caught up in

the outrageous resolutions manufacturers tout. Paper quality, photo software, your digital camera's resolution, and myriad other factors play a part in image quality. Consider less glamorous features, such as paper tray capacity and the printer's duty cycle (the recommended monthly page print limit). Find out what kind of cable the printer requires. Many new printers lack serial ports and require a USB (Universal Serial Bus) cable. Check your computer to make sure you have available USB ports before you head to the store.

Decide what tasks your printer will handle. If you print more documents and newsletters than photos, look for a traditional inkjet. General-purpose printers are often faster than photo printers and most have photo-quality resolutions. Consider speed and resolution when you compare general-purpose printers, but avoid deciding until you visit a store and print copies from a display unit. Many low-end printers suffer from banding, which is a horizontal stripe pattern across the picture.

You won't care what kind of resolution your printer has if your pictures look like window blinds.

Many printer manufacturers, including Hewlett-Packard (<http://www.hp.com>) and Epson (<http://www.epson.com>), have printers that focus on photo printing. Photo printers can print documents, but not as quickly as the less-expensive, general-purpose printers. Photo printers can include a range of features, such as expansion slots, LCDs (liquid-crystal displays), and custom paper trays. If you have a digital camera, look for printers with expansion slots for your camera's media card. The expansion slot lets you bypass the PC and print pictures directly from the media card. Some high-end printers also have LCDs that let you view and (in some cases) edit the image before you print.

Inkjet printers use three colors (in a single cartridge or in three cartridges) to create images and have a separate cartridge for black ink. High-end photo printers have additional inks that increase image quality by reducing the white space in the picture. You can use these printers for higher quality photos, but keep in mind that you'll spend more money on ink refills than you will with four-color printers. ■

Printer Repair Options

Whether you buy an inexpensive printer or the cream of the crop, printer problems are unavoidable. As long as you can power on the printer, you can probably find and fix the problem without taking a trip back to the dealer.

Poor image quality. If your picture is blurry or faded, remove the ink cartridges and put them back into the printer. Go into

the printer's Properties and look for the cartridge alignment and print head cleaning features.

Banding. You may not be able to prevent horizontal streaks, but you can usually reduce the effect by using high quality paper. Make sure you select the appropriate paper type in the printer's Properties.

Paper jam. Remove all of the paper from the paper

tray and reinsert it. Move any guides in the tray against the paper to hold it steady as the rollers pull it through.

Driver updates. Check the manufacturer's Web site for new drivers, which are software patches that can smooth over difficulties between your printer and operating system. ■

BY JOSHUA GULICK



When It's Your Turn To Take Care Of Mom

There Are A Few Motherboard Problems You Can Fix

Ingnore the microprocessor or OS (operating system); the real foundation of your computer is the motherboard. It's the largest PCB (printed circuit board) in the case and is also known as a mainboard or mobo. Sometimes a square foot in area, the motherboard controls all the interaction among your microprocessor and the rest of the devices in your computer. Your CPU controls every bit and byte, but it might as well be sending hand signals in the dark without a motherboard to connect everything.

There aren't many motherboard problems you can fix short of replacing the board, but there are a few issues you can correct if you know how. We'll highlight some of them in this article.

Physical Problems

Remove the side panel of your computer case and take a look inside. Remember to touch a bare metal part of the case often as you work to dispel static.

Today's computers generate a lot of heat, so your motherboard may have fans on its chipset (one or two main support chips for the CPU), in addition to the ones on the microprocessor, case, and video card. If a stray cable hangs into a fan, it can buzz or chatter. Carefully tie cables together

out of harm's way with plastic ties from a hardware or electronics store.

Speaking of fans and cables, ribbon-shaped data cables connected to the motherboard often block the flow of cool air through a computer case. This can allow devices to heat up, which can lead to strange errors (if your RAM gets too hot) and even premature device failure. Move these wide, flat cables aside as much as possible, and secure them loosely with plastic ties. You might also consider replacing them with rounded cables, which allow better airflow.

Next, examine your case for any loose screws rolling around. Remove them so they don't cause any short circuits. It's very rare, but we have heard of screws falling between the underside of a motherboard and the metal mounting plate underneath; this can short out the board, leading to erratic behavior. Check under your board if you suspect this.

Finally, if your computer no longer keeps the correct time and date, you can probably fix this, too, right on your motherboard. Most mobos have a small battery about the size and shape of a few nickels stacked together. Carefully slide this out of its socket and take it to an electronics or watch store to get a replacement. After you install the new battery, double-click the clock in Windows' lower-right corner to set the time and date.

(NOTE: You may also need to reenter your BIOS [Basic Input/Output System] settings in Setup as described in BIOS Updates, the next section.)

BIOS Updates

Most motherboards today store their BIOS settings on a type of memory chip that can be flashed, or updated, to correct bugs or add support for new processors and features. The BIOS is the most basic level of support a motherboard has to interact with devices such as hard drives and video cards. It starts before the OS, such as Windows, which adds more thorough support for more devices. Note that the BIOSes on most pre-1995 motherboards can only be updated by installing a new BIOS chip, which may be hard to find.

Although a BIOS update might correct your PC's problem, it's also the trickiest fix to perform. It's not difficult, but it could make your PC unbootable if something interrupts the process, such as if you shut off the power during the update. In addition, you may not be able to roll back your motherboard to an older BIOS version if the new one doesn't work out. Only update your BIOS if it's necessary.

To determine if you need to update your BIOS, first write down your



motherboard's brand and exact model number, such as Intel D845GEBV2. It's extremely important to get the model number right, as you do not want to try to install a BIOS update from another motherboard. It could disable your system.

Next, find and write down the version number, such as PUKT06AUS, for your BIOS. Windows Me/XP users can find it in System Information. Click Start, Programs (All Programs in WinXP), Accessories, System Tools, and System Information. Other Windows' users can find the BIOS version number by rebooting (turning off and restarting the computer). It will display early in the boot sequence, most likely after the words "Phoenix BIOS," "AMI BIOS," or "Award BIOS" or perhaps after the brand of your computer, such as IBM. You will only have a brief instant to glimpse the BIOS version, so you may have to reboot several times to get it all. Ignore the BIOS version messages of your video card (such as NVIDIA or ATI) and your hard drive controller card (such as Promise or Highpoint), as these also may show up as your system boots.

Look on your motherboard manufacturer's Web site, such as Intel (<http://download.finder.intel.com>), for a list of BIOS updates for your board. Usually, you can click the Support link to find them. Read the descriptions of not only the latest BIOS version but also all the versions after yours to see if any of them correct your problem. BIOS updates are cumulative, meaning that the latest one contains all the fixes and features of preceding versions. Avoid BIOS versions marked "beta" because they are still in testing. Download the latest non-beta version and also download a copy of your existing BIOS version in

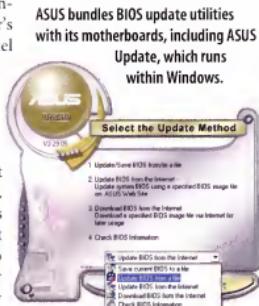
case you have the option and the need to reinstall it later on.

Next, enter your computer's BIOS Setup utility by rebooting and pressing the key(s) it briefly tells you to, such as DELETE or CTRL-S. If you miss it the first time, reboot and try again. Take 10 minutes to write down every setting you can find, using the indicated keys to navigate around. You may need to re-enter these settings later.

Follow The Directions

Finally, follow your motherboard manufacturer's instructions for installing the update. The instructions should be on the download site for your BIOS or in your users manual. For example, some manufacturers want you to copy the BIOS update file to a system startup diskette and start your PC with the diskette in the floppy drive. Others recommend that you run the automatic BIOS update utility that came with your motherboard or PC or just double-click the downloaded update to install it. Some manufacturers, such as ASUS, include a BIOS flashing utility on the BIOS chip, so you'll always have access to an update method, and some Gigabyte boards even have two BIOS chips (one is a backup).

Whatever you do, make sure to follow the directions exactly and let the update program run as long as it needs to. It shouldn't take long, but it's important not to shut off the power to the computer, even if the program appears to freeze for a long time. After the update finishes, restart your PC and enter Setup. Make sure its settings match the ones you wrote down before the update, save your changes, and then exit.



Repair Advice

There's little on a motherboard that a typical do-it-yourselfer can easily fix. If your mainboard fails or gets damaged, refer to the PC Project articles, "The Mother Of All Projects" pages 78 through 80 and "Mother Of All Projects, Part 2" pages 77 through 79 in *Smart Computing's* April and May issues, respectively, for information on how to replace it. If you're a subscriber, you can read both articles at our Web site: <http://www.smartcomputing.com>.

If you do replace your motherboard, here are a few tips. Always use as many screws and standoffs (threaded metal bosses or plastic pins) as the motherboard has holes. Two or three won't be enough. Every time you press in a stick of RAM or an expansion card, the mounting screws and standoffs spread the pressure across the motherboard. Without enough support, your board will flex as you push on it. This could lead to tiny cracks that may either kill the board or lead to irritating, random errors later on.

On the other hand, if you are replacing a motherboard with a different model, don't leave any threaded metal standoffs mounted in places where the motherboard doesn't have holes. Extraneous standoffs could cause short circuits. ■

If your update doesn't work out and you can't boot your computer, follow the mainboard manufacturer's instructions for erasing the BIOS settings, also called clearing the CMOS (complementary metal-oxide semiconductor). Afterward, try installing the previous BIOS and/or re-entering the settings you wrote down, if possible. If nothing works, check with the manufacturer or a repair shop for tech support to get your motherboard back on her feet. ■

BY MARTY SEMS

Core Curriculum

Keep Your Operating System Up To Date

We hope you have forgotten that your OS (operating system) is the most important piece of software on your PC. If so, this means your OS is stable, does its job, and never causes you trouble.

By the same token, your OS really is the most important piece of software on your computer. This means you should take care of it. One way to look after your OS is to keep it up to date with the rest of the world. The rest of the world changes pretty quickly, however, and computer experts have differing opinions about how necessary (or even beneficial) it is to avail yourself of every new bell and whistle.

We'll take a look at a few of the basic things you can do, or avoid doing, to keep the O in your S. For the purpose of this article, we'll confine our discussion to the Microsoft Windows family of OSes.

Update vs. Upgrade

There is a technical difference between an update and an upgrade. It might be said that all upgrades are updates, but all updates are not upgrades.

Upgrading means changing from an older OS version, such as Windows 95 or Windows 98, to a newer version, such as Windows XP. This is the most comprehensive way to make sure your system is current. In fact, if you're still running one of these older Windows flavors, an upgrade to WinXP might not be a bad idea. We'll discuss this option in greater detail momentarily.

In the meantime, you can shore up your OS by performing updates. Performing an update simply means installing a supplemental piece of software designed to tune up performance, provide new utilities, or fix problems.

Microsoft releases periodic software updates to address issues not covered, for whatever reason, in the original release of a product. An update commonly known as a patch, for example, might plug a known security hole or correct some otherwise errant bit of programming code. Another common type of update provides new or improved device drivers (software that controls devices, such as printers, USB [Universal Serial Bus] video cameras, etc.). Some updates may be specific to a certain application, designed to fix or streamline specific programs, such as Internet Explorer or Windows Media Player.

Microsoft generally keeps a steady stream of updates coming, and you can download and install them as they're released. This method is especially useful when major security threats are discovered (or unleashed).

For example, when you turn on CNN and discover a malignant new worm is slithering its way across the Internet by exploiting a hole in the OS you use, you can be sure a patch from Microsoft won't be far behind and you'd be well advised to apply it.

Eventually, Microsoft collects the updates issued to date for a particular OS into a Service Pack, which you usually can order on CD or download from the Internet. For example, Microsoft released Service Pack 1a for WinXP in February 2003. This release, a modified rerelease of Service Pack 1 from the year before, contains all 324 "fixes" developed since WinXP's original release in late 2001.

Should you upgrade your OS or just update the version you have now? The best answer may depend on the age of your current version and how you use it.

To Upgrade Or Not To Upgrade

If you don't use your PC very often, or if you use it only for limited applications, such as basic spreadsheets and word processing, you can probably get by for as long as you like with whatever hardware and software you have now.

If you use a variety of applications, collaborate on projects with other people, or are into things like digital music and video editing, you'll find it pays to keep your OS current. Otherwise, you'll eventually find your OS lagging behind the technology you want to use.

Despite a few inevitable glitches (compatibility gaps and reported issues with device driver support, for example), WinXP is widely considered Microsoft's most stable, robust consumer OS to date. We have to agree with the majority opinion. If you're using an older OS, such as Win9x or the Win9x-based Windows Me, you might consider upgrading to WinXP Home or Professional.

Both versions of WinXP come in upgrade or full editions. The upgrade



package, which is about \$100 for Home and \$200 for Professional, upgrades your Win9x/NT/Me/2000 to WinXP by installing the new OS over the top of your existing one. The full version (about \$200 for Home and \$300 for Professional) installs the entire WinXP OS from scratch (sometimes referred to as a clean install). Despite the doubled price, we recommend buying the full version and performing a clean install for best results. Any number of factors can cause an OS to become unstable, and trying to upgrade an unstable OS can be a migraine waiting to ruin your day. If you go the upgrade route, back up your system thoroughly before you get started.

You can use Microsoft's Windows Catalog and Upgrade Advisor to help determine if your system is a good candidate for an upgrade to WinXP. You can find more information about both utilities at <http://www.microsoft.com/windowsxp/compatibility>.

If your PC, applications, and attached devices are more than a couple of years old, you may find that you don't have sufficient processing power, hard drive space, memory, or compatibility profile to run WinXP. In that case, you have two options: buy a new PC or be happy with your current rig. If you choose the latter option, it's a good idea to make sure your OS is updated enough to maximize your configuration and protect yourself from new security threats.

Perform Updates

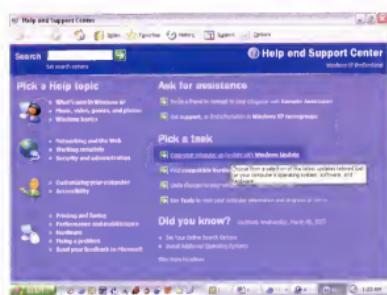
Finding, downloading, and installing Windows updates is a simple matter. The Windows Update home page on Microsoft's Web site (<http://windowsupdate.microsoft.com>) provides all the tools you need.

Once you have accessed the page, click the Scan For Updates button. Windows Update will then scan your

computer and serve up a list of updates available for your system, including service packs.

You can access the same utility through the Windows OS. In WinXP, for example, click the Start button; click Help and Support; and select Keep Your Computer Up-To-Date With Windows Update, which is under the Pick A Task category. Other OSes include a similar link on the Start menu.

If you use WinXP, you can configure your system to download and install updates automatically. Go to Start and Control Panel and select Performance And Maintenance under the Pick A Category heading. Select the System icon under the Or Pick A Control Panel Icon heading. In the System dialog box, click the Automatic Updates tab. Here you can choose one of three options under Notification Settings. One of these options is to disable Automatic Updates. You may find this option suits your preference for reasons we'll discuss next.



Windows Update provides a central resource of patches, security fixes, and updates for your system.

To Update Or Not To Update

Usually, updates are a good thing. But there are times when a "fix" for one component actually breaks another. WinXP, for example, is the first OS from Microsoft to include device driver updates. Although this is an

excellent idea in theory, in practice, we have seen reports from users whose devices worked perfectly before installing an update but actually stopped working after.

The reality is that even though Microsoft tests its updates and service packs before releasing them into the wild, no two PCs in the wild are exactly alike. Depending on the state of your particular OS and your specific hardware/software components, it's always possible that an update or service pack could do you more harm than good.

And even though Microsoft tests its updates and service packs, bugs happen. Sometimes patches need to be patched and service packs need to be refined and rereleased. Microsoft actually rereleased Service Pack 1 for WinXP due to a court decision related to a specific component, not because of buggy performance.

The good news, if you use WinMe/XP, is that you generally can rely on the System Restore feature to undo any damage caused by an update gone wrong. Third-party applications, such as Roxio's GoBack 3 Deluxe (<http://www.roxio.com>), can provide the same service for other versions of Windows.

In general, we recommend installing critical updates, such as security fixes, but waiting for service packs (which generally are tested more thoroughly).

We also appreciate the ability to disable the Automatic Update feature in WinXP and perform our updates manually through Windows Update. Even though it's wise to keep your OS current, you might not need every single new update that rears its head. As handy and hands-free as the Automatic Update feature is, in our opinion, it is always wiser to decide for yourself what you download and install on your system. ■

BY SEAN DOOLITTLE

Glossary

BIOS (Basic Input/Output System)—(Pronounced bye-ose.) A special piece of software built into most computers. BIOS routines control the startup process of the machines and other basic functions, such as the keyboard, display, and disk drives. On older computers, the BIOS is stored in read-only memory, which is not erased when the power to the computer is shut off. Newer computers store BIOS on flash ROM, which can be erased and rewritten if the user needs to update the BIOS program.

cache—(Pronounced cash.) A bank of high-speed memory set aside for frequently accessed data. Whenever data is accessed from or saved to main memory, a copy, along with the address, is saved in the cache. When the processor attempts to access an address, the cache checks its stores. If the memory cache holds the requested address (a cache hit), it returns the data to the processor. If not (a cache miss), a traditional memory access takes place.

CPU—The CPU (central processing unit), also called the microprocessor, is the main processing chip inside your computer that processes all instructions and data. The term "microprocessor" not only refers to the main processing chip in the computer, but also refers to similar chips in other electronics devices, such as a telephone or an automobile. CPU more often refers to the main processor and its related components inside a computer. However, many people use the terms interchangeably. The CPU processing chip is an integrated circuit built on top of a tiny piece of silicon that plugs into your computer's motherboard. The CPU works with several components in your computer, such as the hard drive and the memory area, to manipulate data.

device driver—A program that lets a hardware peripheral, known as a device, communicate with a computer. Some device drivers, such as those for the monitor and keyboard, usually come with the computer, while others, such as those for a CD-ROM drive or a sound card, come packaged with their corresponding device. You can obtain device drivers, as well as updates for



the device drivers, from the manufacturer of the component.

format—Preparing a hard drive (or floppy diskette) to accept data.

FSB (frontside bus)—Conductors that let the processor communicate with other components on the motherboard, such as RAM.

jumpers—An on/off switch, once extensively used on circuit boards to alter hardware configurations, that is composed of wires and a small metal piece. To turn the system on, the metal piece is placed over two of the wires, which connects the wires and makes the circuit complete. When the metal piece is removed from the two wires, the wires do not connect, thus the circuit is

not complete and the system is off. Jumpers are found on devices such as CD-ROM interface boards, bus expansion boards, scanner controller boards, input/output cards, sound cards, graphics cards, modem cards (internal modems), and motherboards.

multitask—The process of having a computer perform multiple tasks simultaneously. During multitasking, you can have your computer perform some tasks (such as calculations or sending faxes) in the background while you work on another program. With true multitasking in a Windows environment, there is virtually no loss of performance.

read speed—The speed at which a drive can read data from a disc.

service pack—A collection of patches and utilities that are released as a sort of "super patch" to keep Windows up to date. Many times, individual components of a service pack have already been released separately, but Microsoft officially supports the complete service packs.

virtual memory—A type of hard drive space that mimics actual memory (RAM). When memory is limited, virtual memory can let users work with larger documents and run more software at once. When a program needs information held in virtual memory addresses, the information is moved to actual memory addresses. Moving sets of virtual addresses (or pages) into actual memory is known as paging or swapping. When virtual memory is used, it appears to the user as if actual memory is in use. The process may be a bit slower, however, because of the time required to swap information between virtual and actual memory.



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P C Project:

Clean It Out With Soap

Return Your Keyboard To Pristine Beauty

Until computers finally learn to understand spoken English, we're stuck typing on keyboards.

And oh, how we abuse them. Pets seem to find them irresistible, and they're magnets for coffee, muffin crumbs, and the hair you pull out when your Internet connection goes down. It's a wonder they keep working

as long and as solidly as they do.

The reliable longevity of keyboards is thanks to their being mostly-mechanical objects that haven't changed much in the past 20 years. Below your keys, there's usually some sort of plastic protective layer, a circuit board, and some wires. When you press a key, it activates a switch on the circuit board that sends a signal to your computer. That's pretty much it, and the simplicity is what lets keyboards survive Coke, cotton candy, and cats.

The simplicity also means keyboards are cheap. An attractive new Logitech USB (Universal Serial Bus) keyboard sells for about \$30; if you have an old machine with a 6-pin round keyboard connector, a new keyboard will cost you as little as \$10 at the local CompUSA. Because keyboards are so inexpensive, most repair shops don't deal with them; they just tell you to go out and get a new one.

That doesn't mean, though, that you won't want to clean your keyboard. If one of your keys is sticking, a little bit of lube may be all it needs. If a key seems dead, there may be something trapped under it (a chunk of muffin?) preventing it from depressing.

I decided to clean my keyboard for aesthetic reasons. My attractive iMac keyboard is cased in clear plastic, and hairs creep up from under the keys and get lodged in the plastic. It looks disgusting, and that's not even counting the tea stains.

Emergency! Emergency!

There are two reasons you may need to clean a keyboard: the slow accumulation of gunk, and keyboard emergencies such as dumping a cup of coffee on your keys.

If you dump liquid on your keyboard, shut down your computer immediately, disconnect the keyboard, run it over to the sink, and turn it upside down to drain. If you spilled a sticky liquid, such as Coke on the keyboard, you can squirt water on the upside-down keyboard to rinse it, says Mike Nadelman of computer-repair.com. Don't submerge the keyboard in water; let it dry upside down.

My keyboard problem was more subtle; I had half a cat's worth of fur in there. So I assembled Nadelman's recommended keyboard cleaning kit: compressed air (\$6 from Radio Shack), my Dustbuster, a soft lint-free cloth,

If a key seems
dead, there may
be something
trapped under it (a
chunk of muffin?)
preventing it from
depressing.



As you remove keys, you may want to assemble them in order on a flat surface so you're sure to put the keys back in the right places.

The Spacebar on my keyboard is hinged, which means it takes extra care removing and reattaching it to the keyboard.

You can gently pop the individual keys loose using two plastic knives. Don't poke or pry; just apply steady, gentle pressure.

Use a cotton swab dipped in rubbing alcohol to remove tough stains from the keys. Test it first; you don't want to rub off the ink.

two plastic knives, a box of cotton swabs, a small tub of soapy water, and a bottle of isopropyl alcohol.

Set The Fur Flying

With my keyboard-cleaning kit at hand, I set out to render my catty old keyboard shiny and new again. My keyboard is out of warranty; if yours isn't, popping the keys off may invalidate your warranty, so you should check with the manufacturer.

Compressed air is the keyboard cleaner's best friend, and it's the quickest and easiest way to get dust and hair out of a keyboard. I started by disconnecting the keyboard, carrying it over to a clean surface, and giving the keyboard a few good zaps with the cold gas. I kept hitting the keyboard with the compressed air pretty often throughout the cleaning process.

To cope with stained keys and the hairs trapped under the plastic, though, I had to start popping keys off. Keyboard manufacturers don't recommend popping off keys, but it's generally harmless if you handle the keys gently. Stick the two plastic knives under opposite sides of a key and pry upward, exerting equal force on both sides. The key is guaranteed to fly off across the room, but that's how you do the job without breaking the key or the switch. Once keys are off, they're actually washable. Rub stains with a wet cotton swab dunked in soapy water, which does the trick for most messes. Save the alcohol for truly stubborn gunk, because it can damage the ink on the keys, and

never, ever, ever use ammonia-based solvents such as Windex. I didn't see any fading from using alcohol on my iMac keys, but Apple is notorious for using indelible inks. Cheaper keyboards might show poorer results.

At first, avoid the big keys, such as the Spacebar, SHIFT, TAB, BACK-SPACE, CAPS LOCK, and ENTER. Those keys may be loaded with springs or hinges that make them difficult to remove or replace. After removing the rest of my keys, though, I saw a huge clot of fur under my Spacebar and had to go for it. I found that if I applied pressure slightly upward (toward the top of the keyboard) as I lifted from both sides of the key, the metal hinges holding the big key down slid free. The hinges were particularly icky, as they're slightly lubricated and that attracts hair.

If your keys feel sticky or are grinding, a drop of a light machine oil, such as WD-40, placed in the center of where the key strikes the keyboard, or on the hinge, or on the spring (if your key has one) should do the trick, Nadelman told me.

As you remove keys, you'll need to remember where to put them. Some people make diagrams. I just made sure to put them on the table in the exact order they were in on the keyboard. Being an utter klutz with spatial relations, I mixed up a few when I put them back, but it was easy to pop them off and replace them.

With all the keys off, the plastic layer protecting the circuit board was revealed. I ran my Dustbuster over the keyboard, shot it with compressed air

a few times, scrubbed it with a slightly soapy paper towel, and picked away at some gunk with an alcohol-soaked cotton swab. Removing the keys also let me get at the hair in the divider between the main keyboard and the numeric keypad; I shot it laterally with compressed air and picked out the hair with tweezers when it started coming into view.

Then I went around the edge of the keyboard with a damp, soapy paper towel, removing stains. There were a few crumbs caught down on the underside of my keyboard, and all the shaking in the world wouldn't dislodge them. The iMac keyboard is one piece, but even if your keyboard is screwed together, keyboard manufacturers and repair shops alike say never to unscrew a whole keyboard: Go only as far as removing the keys.

Popping the keys back on was easy: straight down, with even pressure. For the big keys with hinges, I slid the metal hinges down into their catches with a slight diagonal pressure before pushing down on the key and snapping it in.

Finally, I had a gleaming-white, shiny keyboard. But I was a little nervous about having put it back together correctly, so I went into Microsoft Word and typed every key. Yup; they were in the right place. The keyboard felt a little soft during the first few minutes, but after half an hour of heavy typing, it was as solid as ever. Now if I can just figure out how to stop the cat from sitting on it . . .

BY SASCHA SEGAN

**Quick
Studies**

Microsoft Word 2002

WordArt For The Sake Of Art

You can never have too many fonts. But sometimes you may wish to liven up your text with a visual effect that exceeds the capabilities of your fonts alone, no matter how fancy they are. You might want to warp a phrase in the middle or convert a few words into 3D letters that look as if they were carved from blocks of green marble that recede into the distance.

At such times as these, send your suitcase fonts packing and instead turn to WordArt, which bridges the gap between word processing and graphic design.

Caution: Words Under Construction

WordArt is one of those features that needs room to breathe. It isn't meant to be used for entire blocks of text. Rather, it looks better when applied sparingly, for concise phrases such as titles and headlines in advertisements and flyers.

You'll also need to allow space to use it in fairly large point sizes. The default size is 36. In many of the WordArt styles, you'll find substantially more detail than you will in regular fonts. Keeping things too small might end up obscuring these details or even making the text illegible.

Before adding your text, you'll first choose a style from the WordArt Gallery.

Finally, be aware that using WordArt is more akin to dropping an illustration into your document rather than switching fonts. Most of the time, you'll probably want to allow it its own region on the page, although as we'll see, it's more flexible than you might think.

**Paint The Page With Words**

To add WordArt to your document, you can start in two ways. With your cursor placed where you want the design, from the Insert menu, choose Picture and WordArt. Or open the WordArt toolbar from beneath the View menu and click its Insert WordArt button.

Either method will open the WordArt Gallery, which displays thumbnails of 30 basic styles from which to choose. There's a little bit of everything here. Click the style you want, then the OK button.

Now you'll see the Edit WordArt Text dialog box. You'll enter your text here, rather than on the page. You can also use drop-down menus to select the basic font you want to use (see, those old fonts still come in handy!), plus its size, with buttons to apply boldface and italic. The phrase in the preview window reflects any changes you make, so it's easier to envision the final results.

Click OK and your phrase will appear on the page, transformed into the WordArt style you've chosen.

Almost Suitable For Framing

The results you've just gotten may be exactly what you had in mind, or you can regard them as nothing more than a starting point. First, you can treat the design as you can any other graphic, clicking once to select it and clicking and dragging the handles to stretch or compress it in any direction.

However, most of your mutating will start with the WordArt toolbar, which gives you several ways to alter the design, from subtle to radical. Note that you'll have to actively select your WordArt phrase for some of the buttons to be accessible.

Edit Text. This reopens the Edit WordArt dialog box in case you need to change the text or any of the preliminary font-related choices you've already made.

Gallery. This reopens the Gallery in case you want to switch to a different style.

Format. Love the style but hate the color? Change colors, add transparency, or make several other adjustments here.

Shape. This launches a pop-up menu showing all 40 graphic designs you can apply to your words.

Text Wrapping. WordArt can peacefully coexist with your regular text, even to the point of sharing the same space. Here you can specify the relationship between the two. If you recall last month's column, we used the Behind Text option to fake a watermark.

Same Letter Heights. Click this to eradicate any difference between upper- and lowercase.

Vertical Text. This will vertically reorient horizontal text.

Alignment. Click this to realign the text left, right, or center or justify it within its allotted space. In practice, however, we find its effect minimal.

Character Spacing. If your letters look too cramped, here you can nudge them apart or tighten them up, if that's what they need. ||

BY BRIAN HODGE

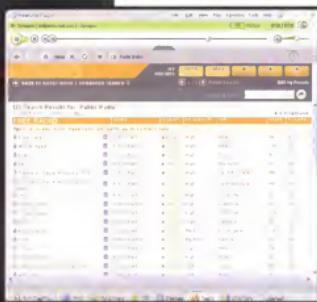
Quick Studies

Online

Use RealOne Player To Tune Into The Internet

With online music-swapping sites in copyright disrepute and the record industry only ponderously moving toward online song sales systems, the Internet might seem a rather quiet place for those who'd rather avoid piracy. One beacon of hope is an eclectic, free online music source roundly accepted as perfectly legal: radio.

Streaming radio feeds delivered over the Internet can sound surprisingly good these days, even over a



RealOne Player is a free program that lets you tune into Internet radio stations from around the world.

dial-up modem. Windows' built-in Media Player is, of course, the Microsoft tool of choice for tapping into these tunes, but it isn't the only option. RealOne Player, the latest media tool from RealNetworks, comes

in a free version that tunes into the Internet like no real-world radio you've ever owned.

Download your own copy at <http://www.real.com>. Keep an eye out for links to the free player rather than the SuperPass version. Install the player and open it up to the main screen. If you can't see the content window very clearly, double-click the tab-like handle on the middle of the dividing line in the center of the window.

Dial It In

To get to the heart of RealOne's radio waves, click the Radio button you'll find along the bottom of the screen. The screen's a bit busy; in the very middle, the largest part of the window is devoted to various buttons advertising different genres of stations. Over to the left, you'll see a small search tool.

First we'll get started with a little demonstration of how cool Internet radio can be. In the Search Radio box, type in the name of a city far, far away. Press ENTER and RealOne gets busy, looking for radio stations streaming out of that location. Chances are you'll find at least a few in the list that appears. Radio stations with local content or that just play a mix of music you can't find anywhere else

are suddenly within reach, whether they're in the next county or on the next continent.

Play a station stream by clicking the station name. The RealOne player will latch on to the stream as you watch the status change from Connecting to Loading; then finally a timer will begin counting up in the upper-right corner of the player. If you don't hear anything, check the volume of your speakers, both on the speakers and in Windows and the RealOne player. The round sliding button in the upper right of the player is the volume control.

Back on the main Radio page, click one of the genre buttons in the middle of the screen. RealOne returns with a list, probably fairly lengthy, of various stations devoted to that style of music or other content. Near the top you may see Premium stations requiring a monthly fee. Scroll through the Free stations and you should be able to find more than you will ever have time to hear.

Change the order of stations by clicking any of the column headers. For instance, clicking Country will redisplay the list of stations in order by country of origin. For each station, the quality column provides some indication of how good the stream will sound. If you're curious about a particular station, click the small, blue "i" icon to get a short description.

Find Your Groove

You can lock in your favorite stations for easy access by clicking Add Station in the row of buttons along the top of the screen. A small list appears displaying all of the stations you've listened to recently. Click the green cross next to one of the stations to add it. A little confirmation window appears; click OK and you're on your way.

Clicking the small Edit My Presets link on the right side of the screen near the buttons opens a new page where you can see all 25 of your preset selections, add additional presets, or change the order in which the buttons appear. To shuffle around the buttons, click in the small box surrounding the preset number and type a higher or lower number. Click the Save button when you're done.

With free music streams blasting from your speakers at will, life is more melodious. Sure, you can't pick a specific song to play next, but on the other hand, it costs nothing and could turn you on to something completely different. ■

BY ALAN PHELPS

Quick Studies

The Print Shop 15 Deluxe

Merge Mail Painlessly

Print Shop Deluxe contains several functions for streamlining the production process. One of the most powerful is the Ultimate Mail Manager, an application within Print Shop Parsons Technology designed.

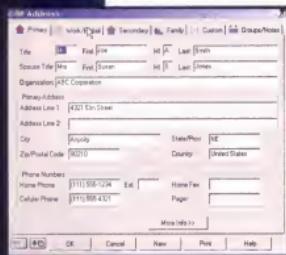
With the Ultimate Mail Manager, you can create address books to hold a wide variety of information about professional and personal contacts. We are going to look at the mail merge capability of Ultimate Mail Manager, its most powerful function and the one most likely to save you time.

The Ultimate Mail Manager lets you merge information from address books into projects you create. These projects can be form letters, mailing labels, envelopes, greeting cards, or others. To show how this works, we will create an address book and an envelope and then merge mail addresses into it.

Get Addresses Together

With Print Shop open, click Addresses/Events and choose Edit Address Book. Ultimate Mail Manager then opens. If this is the first time you have opened the application, several screens appear. Explore them if you want and close each until no more screens appear.

The Ultimate Mail Manager
contains fields for a wide
variety of information about
your contacts.



Now click File, New. A dialog box appears, prompting you to name the new address book and designate where you want it saved. All address books have the .AB2 file extension. Click OK when you are done.

The Add Address dialog box appears, with sections for many types of information. We will stick with the first tab, Primary, because it contains the basic information, such as name and address, that will be used in our sample mail merge. Fill in the blanks in the Add Address box that are required for mailing: first name, last name, and address. Click New when you are done with the first contact. This brings up another blank form for you to fill in. Click OK when you have entered the information for your last contact.

If you need to modify the address book in the future, click Tools, Edit Address Book to open the Ultimate Mail Manager. You can double-click an existing address to edit it or click Address, Add to enter a new address. Click OK when you are done. Now we have an address book to merge into a project.

Merge Data

Let's create an envelope into which we will merge contacts. Click File, New, Envelopes, and Next. Click Personalize A Quick Start Layout and Next. Select the Business theme and click Next. Look for an envelope design you like and click Finish. Make any changes in the design that you wish.

Now we will place address merge fields on the envelope. Click Insert, Text Box. Resize and drag the box to where you want it. Double-click inside the box, which displays a flashing bar for inserting text.

Click Text, Insert Address Merge Field. On the left side of the Mail Merge Fields dialog box are the Address Book Fields, composed of all the fields available. We want First Name, Last Name, Address Line 1, Address Line 2, City, State, and ZIP code. Click First Name and then the Add button. Repeat for the other fields. Click Insert. The fields are inserted into the text box in a single string.

Separate the fields by pressing the ENTER key after each field or inserting a space between them. You can format an address merge field the same way you would any text, such as by changing font type or size, bolding, or centering.

The merging of data occurs during the print process. Click File, Print, and then Merge Names. Click Select List and browse to the location of your saved address book. Click it then click Open. All the contacts for that address book will then appear. Select which contacts you want to merge. Click Select All if you want to merge all the contacts or click Select None and then manually highlight each contact you want to print.

Click OK and click Envelope Feed. Choose the orientation that your printer requires and then click OK. Click Print and a separate envelope will be printed for each contact you selected.

The merge capabilities of Ultimate Mail Manager add valuable functionality to Print Shop. See if it can be of help the next time you start a mass-production job. ■

BY TOM HANCOCK

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Quick Studies

Microsoft PowerPoint 2002

Drawing Tool Tips

When you first start working with the tools on PowerPoint's Drawing toolbar, you'll spend a few minutes gee-whizzing over your newfound ability to quickly create basic shapes and change their colors. But soon it's time to move on to more complex drawings, where you'll grow frustrated if you wade in without learning a few basic skills. The following tips will prepare you to handle the key tasks that are part of getting sophisticated with drawing tools. (Note that PowerPoint's drawing tools use conventions similar to those in most drawing programs, so tricks learned here will prove handy in the future.)



Learning a few basic drawing functions, such as grouping all the objects that make up this simple skyline so they can be manipulated as a unit, eliminates a lot of wasted time and amateurish results.

Format it once. Once you pick a look you like for your drawing objects, you don't have to reapply it every time you create a new object. Set the format once and tell PowerPoint to apply it to all new objects. Format one object's characteristics, such as the fill color and border, and then choose Format, AutoShapes. Click Colors and Lines and choose the Default For New Objects option. Now every shape you draw will have the same formatting.

Press SHIFT for accurate shapes. Drawing pictures isn't exactly gunslinging, but it puts the same premium on a steady hand. Many a cocky user has been humbled trying to draw a perfectly round circle with the circle tool, create a truly square square, or drag a straight line. Make it easy on yourself by holding down the SHIFT key while drawing these shapes. You'll get perfectly round circles and other shapes that are better than you could draw them manually.

Work in groups. Grouping objects is a key part of boosting your drawing skills. After a little experimentation, you'll soon want to create complex drawings that include many different objects. After lining up all the parts perfectly, you need to be able to move the entire drawing across the slide or rotate all the parts at once rather than moving 10 or 15 pieces individually. Grouping also lets you change formatting, such as fill color, for several items at

once. To group the items so they act as one, click each one successively while holding down the SHIFT key. Then click the Draw button on the Drawing toolbar and choose Group. Now, clicking any part selects the entire assembly. To ungroup items, click the group and choose Draw, Ungroup.

Learn about layers. A close cousin to grouping is the idea of layers. You may have already run into layers when one object overlapped another, and although you could see the second object, you couldn't click it. That's because it's in a lower layer. To sort through layers of objects, click the top object and press TAB to cycle through all the items until the object you need is selected. As you learn more about using layers, you'll be able to create interesting effects by overlapping elements. To move objects up or down a layer, click Draw and choose Order.

Keep items in line. Another step that seems basic but proves difficult when you try it manually is lining up elements, whether they're little boxes that represent windows on your drawing of a skyscraper or boxes of information scattered around a slide. Even subtle misalignment gives an amateurish impression to your audience. To keep elements in neat lines, click Draw and use Align Or Distribute, Snap-To Grids, and Nudge features. Align Or Distribute makes it easy to spread items evenly around the slide or center them on a slide horizontally or vertically. Setting up Snap-To Grids makes it easier to set items in specified positions. Nudge provides a way to move an item a smaller distance than hand-to-mouse coordination usually allows.

Save time with duplication. When you create just the right shape—maybe it's even a combination of several objects put together to get the look you want—don't waste time trying to re-create its twin for use elsewhere on a slide or presentation. Select the object and press CTRL-D to clone the shape as many times as you need to. Need a mirror image of your object? Duplicate it, then click the Draw button and select Rotate or Flip.

Erase your mistakes. If all your newfound knowledge somehow fails you and you make a drawing misstep, remember that CTRL-Z is your ticket out of a bad move. Pressing it undoes the last change you made. If you find yourself far down the wrong road, click the Undo button (a fishhook-shaped arrow pointing to the left) on the Standard toolbar to see a long list of recent actions you can take back. ■

BY TREVOR MEERS

Quick Studies

WordPerfect 10

Direct Readers With Cross-References

Sometimes you need to refer readers to graphics from within your documents. Use the WordPerfect Cross-Reference tool to point your readers in the right direction.

Cross-references have two parts: the reference and the target. The target is the graphic or picture you want to point out in your text. The reference is the actual text within the document that mentions the target, such as "See Figure #." Rather than constantly updating your references, let WordPerfect do it automatically through the Cross-Reference tool.

Create Cross-References

To create a cross-reference, you must mark the reference and the target. Click the mouse in the document where you want the cross-referencing text that tells the reader where to look. Type the introductory text you want, such as See Figure, and apply any formatting you want. Leave a space between the text and the reference number WordPerfect will insert later.

Next, click Tools, Reference, and Cross-Reference. The Cross-Reference toolbar appears at the bottom of the main Property Bar. Click the Reference button on the left and select Counter. In the Counter dialog box, select the appropriate option from the list of different types; click OK.

In the Target field on the Cross-Reference bar, type an identifying name for the target you want to reference. Click Mark Reference and a question mark appears in the document's reference spot following your introductory text. The question mark remains until the cross-references are generated at the end of this process.

After you've marked the reference, identify the target item. First, check to make certain the identifying name for the target is still visible in the Target field. Use the drop-down menu to find the right target if you have more than one.

Now right-click the graphics box that will be your target and choose Edit Caption. Place the cursor after the caption and then click Mark Target on the Cross-Reference bar. You'll need to click

outside the graphics box to deselect the box and return to the main document. Repeat these steps to add separate cross-references to the remaining graphics boxes.

Update Cross-References

When you're done marking the references and targets, you must generate the actual cross-references. Click Generate on the Cross-Reference bar. WordPerfect replaces each question mark reference with its appropriate reference number.

If you make changes to the document, click Generate again to update the cross-references. However, sometimes when you update a document, the links between a reference and a target are broken. WordPerfect alerts you to these broken cross-references with a question mark ("See Figure ?"). If you see these question marks after you've regenerated, mark the reference and target again and then regenerate to fix these broken links.

Multiple References Or Targets

After you've mastered cross-referencing, you might try more advanced references. For example, you can cross-reference a single target with more than one reference type ("See page 3, figure 2").

To mark a single target with the page number and the figure number, click where you want the reference. In the Reference menu, choose Page. Type the figure number in the Target box or choose it from the menu and click Mark Target. Next, click where you want the reference displayed, type See page followed by a space, and click Mark Reference. Repeat these steps using Counter in the Reference box.

If you want to cross-reference more than one target with the same reference, such as "See Figures 1, 2, and 10," mark the reference once and then mark each target separately using the same target name. Note that one target can have multiple target names. When you generate the cross-references, a comma and a space will separate each target.

Cross-references work with elements other than graphics. Once you have the basics down, try referencing pages, footnotes, chapters, or anything else under the Reference menu. Help guide your readers, and they'll learn more from your hard work. **II**

Understanding Cross References

Organizing your information before creating cross-references makes them easier to use. Your PC is an incredible asset for this reference, especially if you are a genealogist or historian. Use it to store your family tree (including names, dates, marriages, places, ancestors, descendants, and so on), and then use the Cross-Reference feature to quickly generate cross-references to your family tree. You can also use the Cross-Reference feature to create cross-references to other documents, charts, and indexes. See page 2, Figure 1.2.



Figure 2 People on deck

Use cross-references to refer the reader to specific graphics.

The question mark remains until the cross-references are generated at the end of this process.

After you've marked the reference, identify the target item. First, check to make certain the identifying name for the target is still visible in the Target field. Use the drop-down menu to find the right target if you have more than one.

Now right-click the graphics box that will be your target and choose Edit Caption. Place the cursor after the caption and then click Mark Target on the Cross-Reference bar. You'll need to click

BY ANNE STEYER PHELPS

Quick Studies

Lotus 1-2-3

Dating 1-2-3

Working with dates and times can get tricky. All months do not have the same number of days; 2:00 may be a.m. or p.m.; and let's not even talk about leap years. Well, 1-2-3 knows all the rules and can help you easily format or calculate dates and times.

1-2-3 assigns a number to all dates and times, which makes it possible to perform such calculations as computing an age or determining the time spent on an activity. Jan. 1, 1900, is assigned as 1, and so on all the way to Dec. 31, 9999. Values for time start with .000000 for midnight through .999988 for 11:59:59 p.m.

In order for 1-2-3 to know that your data is a date or time, you will need to enter it in a format that 1-2-3 recognizes. Use the standard notation to enter a time: hour colon minutes (12:15). If the time is after noon, be sure to type pm after the time or use military time (20:00). For dates, you can type Aug-68, 11-Aug, 11-Aug-68, or 8/11/68. You can use two-digit years (68), but you will always avoid ambiguity if you use four digits (1968).

Even though you have to enter data in these formats, you can change how it will appear on-screen. Right-click the cell and select Range Properties from the pop-up menu. Select the Number Format tab (it has the pound sign [#]), select Date or Time from the Category list on the left, and then choose a format from the list on the right.

Because dates and times are stored as numbers, you can use them in formulas. An easy way to use dates in formulas is to enter the date in a cell and then, in another cell, create a formula that references the cell with the date. For example, in the graphic shown here, customers get 30-day warranties. To get the exact expiration date of the warranty, the accountant created a formula that simply adds 30 to the value in the Purchase Date cell (B5 + 30). If the accountant wants know how long it took to make a certain repair, she can figure the total repair time with a straightforward formula that subtracts the Start Time from the End Time.

For some calculations, you may need the current time or date. Type @TODAY in a cell and

1-2-3 returns the present date according to your computer's clock. Type @TIME for the present time or @NOW for both the time and date. These functions do not display the time or date but the number that is assigned to that time or date. However, you can format the cell to use a specific date or time format by selecting another style from the InfoBox, as described earlier.

These three @functions can also be used within formulas. Say the accountant in our example wants to know how long it has been since the customer made his purchase. She subtracts the earlier date from today's date using the formula @TODAY-B5.

This formula, however, gives a result measured in days. This is the default for date calculations. Showing the result in years here would make more sense, so we perform the calculation with

@DATEDIF(start-date; end-date;format). The start and end dates are a cell address or @functions, such as @TODAY. In the format, use M if you want the result in months, Y for years, and D for days.

As you work more

with the date @functions, you may want to enter an actual date instead of a cell address. Here it gets slightly tricky because 1-2-3 wants to work with dates in a single number format, as in 75388. Typing 8/11/68 in a function, such as @DATEDIF function, will only result in an error. To use a specific date in a formula, type @DATE(yy;mm;dd) where yy displays the answer in years, mm in months and dd in days. You can then nest the @DATE function within other functions, such as in the formula @DATEDIF(@DATE(68;08;11);@TODAY,"Y"), which would give the age of someone born Aug. 11, 1968.

As you get more proficient, look into using some of the 26 other calendar @functions by clicking the @function button (found under the menu) and selecting List All and selecting Calendar from the Categories list. ■

BY TRACEY DISHMAN PATTERSON

	A	B	C	D	E	F	G	H
	Warranties							
4	Purchase Date	Date	Warranty Expires	Repair#7Time	Start Time	End Time	Repair Time Since Purchase	Total
	02/01/2002	02/01/2002	03/01/2002	09:30 - 10:45	09:30	10:45	01:15	398

1-2-3 assigns numbers to dates and times, making it easy to perform such calculations as finding the age of a particular item.

Quick Tips

Secrets For Succeeding In Common Tasks

Winamp 3.0

This popular MP3 player contains a number of keyboard shortcuts to quickly accomplish common tasks. Whether you like to turn off your monitor while listening to background music or just hate reaching for the mouse when it's not necessary, these keyboard shortcuts are for you. To see a list of shortcuts, right-click Winamp and select Nullsoft Winamp3 Version 3.0c. Select the Keyboard Shortcuts tab to see a list of options. To play/pause a track, for instance, press X. To stop a track, press V. B and Z move you to the next track and previous track, respectively.

Word 2000/2002

Positioning images within Word documents can get frustrating because Word automatically aligns the image to an invisible grid. To override the grid, double-click the image and the Format Picture dialog box appears. Select the Layout tab and select a wrapping style other than In Line With Text. Click OK. If you're still having trouble positioning the image, press the ALT key while moving the image, which lets you move the image smoothly instead of incrementally.

Excel 97/2000/2002

Customize the way numbers appear in your

spreadsheet. Instead of typing 2/3/03 to specify a date or \$13.99 to signify money, tell Excel to format the cell for you. To do this, highlight the rows or columns you want to format, click Format on the Excel toolbar, and select Cells. Once the Format Cells dialog box opens, select the Number tab and choose a category from the Category list that pertains to the format you want to use. You may need to specify further if another drop-down menu appears on the right. Click OK to close the box and set the changes.

Outlook 2000 & Later

Outlook helps you send email messages to all of your friends for that big

To checkbox, then type the email address for the person who will handle the RSVPs. If you don't want to type the address manually, click Select Names, double-click the address or addresses you want to include, and click Close.

Palm OS

Typically, to delete a contact, memo, appointment, or to-do item on a Palm OS PDA (personal digital assistant), you'd select the item and tap Details, Delete, and OK. To quickly erase an item without going through all the extra taps, select an entry and use the Command stroke (/; drawn from bottom to top) followed by a D character in Graffiti. Alternatively, you can highlight all text in an item and write a dash (-;

drawn from right to left) to erase all text. (This method won't delete items with a note attached.)

iSoftware Sandra Standard

When your computer slows down, it may be malfunctioning or your 5-year-old hardware might be outdated. The Sandra utility, which you can download free (<http://www.sisoftware.net>), will give you a peek at your computer performance ratings. There are a number of useful tests, such as the Multimedia CPU Benchmark, that will rate your PC's performance and compare your hardware to dozens of other PCs. If you see a big gap between your PC

and more modern PCs, it may well be time for an upgrade.

Internet Explorer 5.0/5.5/6.0

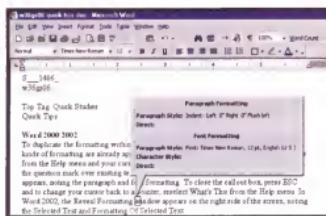
If you're tired of typing the entire address for a Web site in Internet Explorer's Address line, start using the CTRL-ENTER keyboard shortcut. Simply type the Web site's name in the Address line (for example, smartcomputing) and then press CTRL-ENTER to add "http://www." to the beginning of the Web site's name and ".com" to the end of the name.

Email

If you read through a lot of online forums, you'll probably notice some users employ clever tricks to hide their true email addresses. This helps fool the programs spammers use to scan the Web for valid email addresses. You can use the same tactics to help protect your email address. For instance, if your email address is smart24@smartcomputing.com, you might want to enter your email address as smart DELETE24@smartERASE computing.com. It should be clear to most users that they should remove DELETE and ERASE when emailing you, but spammers will record the address as smartdelete24 @smarterasecomputing.com.

Outlook 2000 & Later

If you have trouble sifting through dozens of email messages, you can use the Rules Wizard to route incoming mail to specific folders. From the Tools



This Word 2000 callout box displays the paragraph and font formatting for the selected text.

summer bash, but you may not want to deal with the many RSVPs they send back. Funnel those replies to someone else's inbox instead. After you compose your invitation, click Options (located in the standard Outlook toolbar) to display the Message Options dialog box. In the Delivery Options section, click the Have Replies Sent

menu, click Rules Wizard and click New. Click Check Messages When They Arrive, click Next, and click the From People Or Distribution List checkbox. In the Rule Description section, click People Or Distribution List and select the email address or addresses that you want this rule to affect. Click Next and then click the Move It To The Specified Folder checkbox. In the Rule Description section, click Specified and select the appropriate folder. Click OK and Finish to apply your new rule.

Word 2000/2002

To duplicate the formatting within a Word document, you'll need to find out what kinds of formatting are applied to existing text. To do that, select What's This from the Help menu and your pointer changes from an arrow to a question mark. Position the question mark over some text and click. In Word 2000, a callout box appears, noting the paragraph and font formatting. To close the callout box, press ESC. In Word 2002, the Reveal Formatting window appears on the right side of the screen, noting the Selected Text and Formatting Of Selected Text.

Windows 98/Me/XP

The Windows Magnifier comes in handy for people with impaired vision. To access the Magnifier, click Start, Programs (All Programs in Windows XP), Accessories, Accessibility, and Magnifier. The Magnifier

Settings dialog box will automatically open with the Magnifier. Use this box to set the level of magnification and change tracking options. Once you've chosen your settings, click OK in Win98 to close the dialog box and save the settings. WinXP and WinMe users need to minimize the dialog box; if you close it, you will close the magnifier. Click and drag the magnifier to change its size and location on your screen. To close the magnifier, right-click it and select Exit.

Internet Explorer 5.5/6

Use some of these keyboard shortcuts in Internet Explorer and give your mouse a break. Press ALT-HOME to access your home page; ALT-Right arrow to skip to the next page and ALT-Left arrow to skip to the previous page. Use the Up arrow and Down arrow to scroll through a page quickly or press HOME to jump to the top of the page and END to jump to the bottom. Press CTRL-N to open a new window and CTRL-W to close the current window. Additionally, CTRL-E opens the Search bar and CTRL-I opens the Favorites bar. Finally, use F11 to toggle between full-screen and regular view of the browser.

Email

Occasionally, when you download an application, a Web site or installation program will ask for your email address. If a proper email address isn't vital to

the functioning of the software (the company doesn't have to send you a password via email, for instance), provide a fake email address (that's right, lie). If you have to provide a valid email address, try to use a temporary account (such as a Web-based account) instead of your primary email address.

WinZip 8.1

WinZip is a well-known utility for file compression and extraction, and you can download a trial version from the company Web site (<http://www.winzip.com>). If you already have the program, you probably know you can right-click a file you want to manipulate and then select a WinZip option from the context menu that appears. If that context menu has too many options for your needs, feel free to customize it. From the Options menu, click Configuration and click the Explorer Enhancements tab. In the Context Menu Commands box, you'll see a list of all your context menu options. Clear the checkboxes for any options you don't want and click OK.

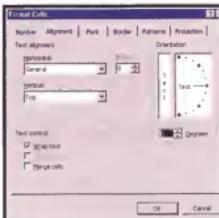
Windows 98/2000/NT/Me/XP

The Invert Selection option in Windows Explorer's Edit menu is a nifty tool when you need to select several files in a folder. If you need to select all but a few files within a folder, instead of going through and selecting each file you need, simply select the files you

don't need. Then select Invert Selection from the Edit menu; all the files that weren't selected are now highlighted, and the files that were selected are no longer highlighted.

Excel 97/2000/2002

Dress up your Excel files by aligning text vertically, horizontally, or any other way you want. To do this, highlight the rows or columns you want to format. Click Format in the Excel toolbar and click Cells to open the Format Cells dialog box. Next, select the Alignment tab. To place selected text at a different angle, click and drag the word "Text" in the larger box of the Orientation section or use the up and down arrows next to Degrees to select an angle. Use the Horizontal and Vertical drop-down menus to select the position of



Click and drag the word "Text" in Excel's Orientation box to change the alignment of text in the selected cells.

corresponding text in the cell. Under Text Control, you can also choose Wrap Text, Shrink To Fit, or Merge Cells.

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Tips & Tricks You May Have Missed

Nifty Tricks For Popular Applications. You can customize some features of programs designed for Windows. Here we give a few tweaks for WordPerfect, Lotus 1-2-3, Lotus Approach, Word, Excel, and Outlook. From the April issue of *Smart Computing*.

<http://www.smartcomputing.com/apr03/tricks>

Print Your Photos. Printers play a small role in the quality of digital photo prints. Many other factors influence whether you can get print-quality photos from your digital camera, including the camera itself. We'll cover

some of those factors here. From the March issue of *Smart Computing*.

<http://www.smartcomputing.com/mar03/print>

That Does Not Compute. If you use Windows long enough, you're bound to see an error message. In some cases, error messages are helpful and easy to interpret, but most of the time, they raise more questions than answers. We take a look at the basic causes for many of the most common Windows errors and tell you how best to respond. From our *Learning Series: PC Troubleshooting*.

<http://www.smartcomputing.com/apr03/error>

Software Tips & Tricks: More Media Players, More Tricks. Most of us can agree that PC media players are about four or five generations away from perfection. Now, our multimedia runs correctly on one player but not another. From the April issue of *Computer Power User*.

<http://www.smartcomputing.com/apr03/media>



Featured Articles

Nifty Tricks For Popular Applications

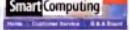
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When you first launch Word, Excel, WordPerfect, Approach, Lotus 1-2-3, or any popular application there, it's hard to believe that you'd ever need anything more. After all, these programs are packed with features. They're all complete, after all, with so many features that you'd never know where to begin. But what if they did have a few more tricks up their sleeves?

86 June 2004 / www.smartcomputing.com/apr03/tricks

Memory Burn. With a DVD writer and a little time, you can convert that old VHS collection to DVD. From our *Reference Series: Working With PC Files*.

<http://www.smartcomputing.com/jan03/memory>



Reference Series

Working With PC Files

January 2004 Vol 7 Issue 1
Pages 12-17 in print issue

Memory Burn

Save Your Videos To DVD

Technology

Windows

Mac OS X

Linux

Hardware

Software

Networking

Security

Computer Power User

Software Tips & Tricks

More Media Players, More Tricks

It's safe to say that most of us are about four or five generations away from the last media player we used. As more functionality pours in, and MP3 players play more than just music, media players are becoming more and more complex. And so, the new issue of *Software Tips & Tricks* has some quick fixes and operating tips for some popular media players and the versatile Media Player and Winamp.

On sale now! www.smartcomputing.com/apr03/media



RealOne Player Plus

RealNetworks' media player software used to be ubiquitous, but it's not quite the presence it once was, the newer RealOne

is much less so. Use RealOne Player Plus

to play MP3 files and more.

June Web-Only Articles

To Access These Web-Only Articles:

Here's how to access these articles available online *only* for subscribers to *Smart Computing* magazine:
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Hardware

For all the latest product reviews, visit the Hardware Reviews & Comparison Charts area at [SmartComputing.com](http://www.smartcomputing.com) (<http://www.smartcomputing.com>).

Software

Multimedia: Ulead Systems Ulead VideoStudio 7

Security: SentryBay Viralock

Drive Utilities: LIUtilities WinBackup

PDA/Portable: Omega One Software Battery Bar 2002 V4.2

Misc. Consumer: Broderbund Family Lawyer 2003 Deluxe Home & Business

Desktop Publishing: Alphabit Desktop Author 3.0

SITE GUIDE

TIPS

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As a subscriber, you have access to complete hardware reviews on the *Smart Computing* Web site. Click Read Hardware Reviews and narrow your search to find the product(s) you are looking for. Click the product name to read a full review. If you have used this product, scroll to the bottom of the review and click the Be The First To Write A Review Of This Product link to write your own product review. Your review will appear on the site after a *Smart Computing* staff member reviews it.

PC Operating Instructions

Linux:

Conexant Winmodems & Linux

If you're stuck with a software modem, you're probably having trouble getting it to work in Linux. This month, we show you how to get software modems that use Conexant's HCF and HSF chipsets working with Linux.

Win9x/Me: Better Sound, Brighter Color

If you're using an older system and are interested in upgrading your audio or video, you may have to make adjustments to the BIOS (Basic Input/Output System). We'll tell you what you need to know to get it done.

Win98: Mystery System Files

Windows 98 was supposed to be a spiffy non-DOS 32-bit operating system when it was released, so why are there still mysterious old DOS files lurking in your Win98 machine? We'll explain.

Quick Studies

Security

Share Files & Folders

Email

Check Email With Opera

Microsoft Works Suite 2002

A Picture-Perfect Party

Roxio PhotoSuite Platinum

Introduce Yourself With A Name Tag

HTML

Cascading Style Sheets, Part 1

Photoshop 6.0

Design A Simple Logo

Microsoft Excel 2002

Print Oversized Spreadsheets

Access 2002

A Few Techniques For Better Forms

Web Browsers

Take The Web Along With Mobile Favorites

PageMaker 7

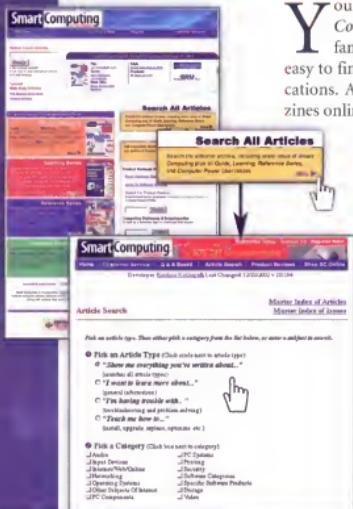
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This Month's Feature:

Threw It Away? No Sweat!



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- 3 Choose a category to do a drill-down search; otherwise enter a subject keyword or phrase for your search.
- 4 Choose Word Search to search for keywords within the article; choose Phrase Search to search for keywords in sequence within the article.
- 5 Click Search.

How can I improve the results?

- Be specific, but not too specific. If you are searching for a digital camera, for example, use keywords that relate to digital cameras, such as the manufacturer or product name, rather than camera specifications.
- Do not use full sentences. Use only keywords or phrases to receive the best results.
- Narrow your search. If your keyword or phrase produces too many results, try including terms that will help narrow the search. For example, if you entered "digital camera" in the first search, try including the manufacturer name, along with "digital camera."
- Don't narrow your search too much. If you only include one publication for your search, try adding another publication or changing search dates to see if you can get better results.
- Sort by. To bring up a list of articles most applicable to your search term, use the default to sort results by relevance. To view the most recent articles first, sort results by date. You'll find these sort options on the main search page and near the top of any results page.
- Still overwhelmed? Choose fewer magazine selections in the Search By Publication area. It may also help to designate a specific date range.

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article listings show the type, magazine, date, volume, and issue. To view a listing of articles with titles beginning with a particular letter, click the specific letter at the bottom of the page.

A screenshot of the Smart Computing website. At the top, there's a navigation bar with links like Home, Search, and Log In. Below it, a sidebar on the left lists publications: Smart Computing, Digital Photography, PC World, Macworld, and PC Format. The main content area is titled 'Smart Computing® Publications' and shows a list of articles. The first few articles are: 'Smart Computing', 'Digital Photography', 'PC World', 'Macworld', and 'PC Format'. There are also links for 'Jump To First Occurrence Of' and 'Jump To Last Occurrence Of'.

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- If you perform a keyword search and are viewing an entire article found in the results, you will see a Jump To First Occurrence Of link under the article headline. Click the keyword(s) to view the first time the word appears in the article.
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Narrow Your Search

- 1 Browse to the bottom of any results page.
- 2 Select an article type and change the keyword or phrase, if desired.
- 3 Select which publication(s) to include in your search. You can include one or all of the publications in your search.
- 4 Searches automatically default to articles written in the past five years. To search older articles, click the radio button next to Articles Older Than Five Years.
- 5 If you know the approximate date of the article you are searching for, enter a date range to search in the Published On Or After and Published On Or Before fields. Create an open-ended search by leaving one field blank.
- 6 Click Search.

Find More Online

We can't possibly fit every helpful tip, tweak, or troubleshooting tidbit in print. That's why you'll find a wealth of resources at our Web site, SmartComputing.com. Here are some tips for using our Web site to find more information about the articles in this month's print issue.

More Upgrading Info

Articles in this month's feature package focused on repairing and upgrading your computer. If you are looking for more tutorial and tips articles related to upgrading, check out our Web site. Try the following options:

1. Search All Articles. Use the tips mentioned in the previous pages to search the online article database for information about upgrades. Or, to see a list of issues on upgrading, click the yellow Search All Articles box, then the Master Index Of Issues link. Look for these issues:
 - *Smart Computing* June 2002: *How To Build A PC Learning Series: PC Upgrades*
 - *Computer Power User* November 2001: *Your Next Big Upgrade*

2. Q&A Board. Click the yellow Q&A Board box on the home page. At the bottom of the Q&A Board page, type keywords such as upgrade CPU or add memory and click Search. If you don't find the help you need within those results, post your question to the board by clicking the Post A Question link in the upper right. Be specific about what you'd like to do, and another subscriber may just be able to help.

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If you recently changed your email address, be sure to update it on the SmartComputing.com site. After you log in to the site, an Update Email Address box appears in the upper left under the Welcome message. If this email address is incorrect or has changed, enter your new email address and click Change.

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Anatomy Of A Computer

Have you ever looked inside the box you use every day? The ports peeking out of the front and back of the PC are only a few of the dozens of components that make up your computer. If you are planning to upgrade your PC or replace a broken component, it won't hurt to take a look at the descriptions below before you crack open the case.

Motherboard

The motherboard is a large PCB (printed circuit board) that houses most of your computer's components and directs data traffic to and from the appropriate devices. The most popular motherboard sizes are ATX and microATX.

PCI

PCI (Peripheral Component Interconnect) slots let peripherals communicate quickly with the processor. You can add devices, such as modems and sound cards, to the PCI slot. PCI device ports protrude from the back of the computer.

RAM

The CPU stores temporary information, such as data relating to open programs, in RAM. When the RAM reaches its capacity, the processor redirects the excess data to your hard drive. Because the hard drive isn't nearly as fast as RAM, this virtual memory stores and releases data at a slower rate. If your computer performs slowly when you have multiple programs open, you can usually increase the performance by adding additional RAM.

BIOS

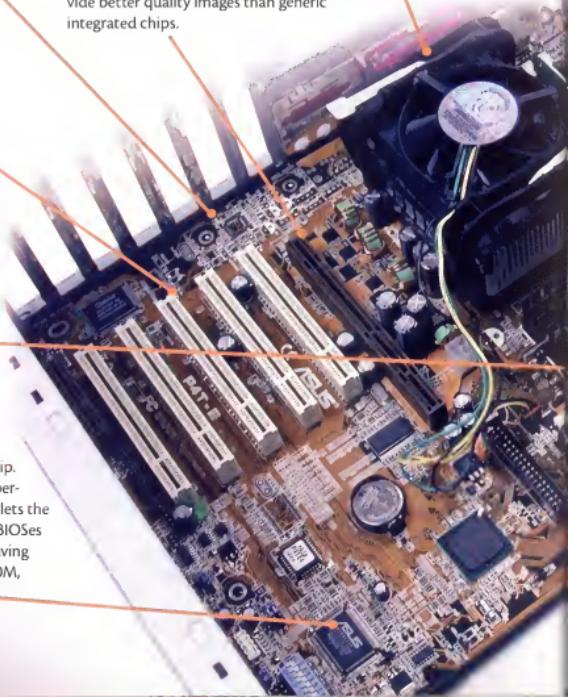
The motherboard manufacturer installs a basic OS (operating system) in the BIOS (Basic Input/Output System) chip. The BIOS activates when you turn on the computer and performs system checks before starting your main OS. It also lets the processor communicate with the PC's peripherals. Many BIOSes let you configure some system activities, such as power-saving functions. Newer BIOS chips store information in flash ROM, which lets users upgrade the BIOS software.

CPU

The CPU is the brain that carries out your computer's instructions. You won't be able to see your CPU when you open your case because a heatsink covers it. Heatsinks are metal blocks (often copper or aluminum) that cool the processor by dissipating the heat. Many heatsinks use fans to augment the cooling process.

AGP

The AGP (Accelerated Graphics Port) houses your graphics card, which supplies the image to the monitor. Some motherboards include an integrated graphics card. AGP graphics cards, which often include additional RAM, generally provide better quality images than generic integrated chips.





FireWire/IEEE 1394

Current FireWire ports transfer data as fast as 400Mbps (megabits per second). (The next generation of FireWire offers speeds as fast as 3,200 Mbps.) You can use FireWire to connect many different types of peripherals, including digital cameras and digital video cameras. Like USB ports, FireWire ports are hot-swappable, which means you can connect a device to the FireWire port, unplug it, and connect another device without rebooting the computer.

USB

Many peripherals, such as MP3 players, modern printers, and PDAs (personal digital assistants) require USB (Universal Serial Bus) connections. Some devices are able to draw power from the computer in addition to data through the USB port. USB 1.1 ports transfer data at 12Mbps (megabits per second), while new USB 2.0 ports can transfer data at up to 480Mbps. Keep in mind that if you have a USB 1.1 peripheral and a USB 2.0 port, data will transfer at the USB 1.1 speed.

PSU

The PSU (power supply unit) isn't the prettiest component by any means. It funnels power through the multicolored cables (many cables have more than one connector) to each device.

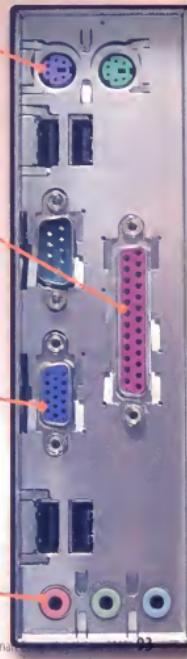


PS/2

Although some newer mice and keyboards include USB cables, most require PS/2 ports. Manufacturers generally color the keyboard port purple and the mouse port green.

Parallel Port

If you have an older printer or scanner, you probably connect the device to the parallel port. USB and FireWire connections are quickly replacing parallel ports on most peripherals, including scanners and printers. Keep that in mind the next time you buy a peripheral; you'll want to be sure that you have an available USB port and you may need to buy a USB cable.



Serial Port

Serial ports are much slower than new USB and FireWire ports. You can attach some older keyboards, mice, and modems to the serial port, but chances are your serial port is free. The serial port is also known as a COM (communications) port.

Sound Card

Motherboards often have integrated sound chips. If your motherboard does not have a sound chip or if you want better sound quality, you can buy a sound card. Most sound cards attach to one of the motherboard's PCI slots.

Welcome To Your Unstable Equilibrium

Isometimes wonder if Alice Cooper was predicting the future when he sang, "Welcome to my nightmare" back in 1975, because it describes the way we often feel about our personal computers.

Think back to your high school physics class when your teacher explained the difference between stable and unstable equilibriums. The rocking chair at rest is the classic example of a stable equilibrium: If you give it a push it eventually comes back to rest where it started. Take that same rocking chair, turn it upside down, and balance it precariously on its back support and you have an unstable equilibrium. Deviate from the point of equilibrium and it all comes crashing down.

It has been my observation and experience that personal computers are unstable equilibriums, naturally prone to disruption and disaster. The equilibrium is so tenuous that even the most seemingly innocuous change to your computing environment can precipitate a computer disaster.

Computing On The Edge Of Disaster

One might think that PC technology has matured to the point where computers are more stable than ever before. Certainly, each new release of Microsoft Windows is more stable than previous versions. But it would be wrong to assume that a stable OS (operating system) can preclude computer disasters. After all, Windows can do nothing to prevent computer viruses, spyware, or hard drive failures.

Nor can Windows prevent Homer Simpson computer catastrophes, otherwise known as self-inflicted disasters. Let's face it: We all occasionally do dumb things. I recently received this call from a friend: "Alan, I deleted a lot of stuff off of my computer that I didn't need and now my speakers don't work."

In fact, computer disasters are more common today than ever before because our computing environments get more complex and unstable with each passing year. We use more applications than ever before, and the opportunity for these applications to conflict with each other, your computer's OS, or hardware components is substantial. Sadly, simply installing an ill-behaved application or piece of hardware can trash your computer.

We also place more demands on our computers, and we have more computers than ever before, effectively multiplying the chances of a computer disaster.

At the same time, the Internet is becoming more dangerous, and broadband connections significantly increase the chances of a disaster caused by a computer virus, spyware, or hacker.



Ignorance Is Not Bliss

I find that most people remain not-so-blissfully unaware that their computers are unstable equilibriums. They assume that their computers will be as reliable as their televisions, ignoring two critical differences between these appliances:

- Televisions today are 100% electronic, whereas the most important device on your computer, the hard drive, is also the component most likely to fail because it is electromechanical in nature.
- Your computing environment, unlike your television, is constantly changing. You install new applications and updates to existing applications. Remember that change and stability are mutually exclusive concepts.

Computer disasters are gut-wrenching experiences, as anyone who has seen his MP3s and digital photographs vanish can attest. And if a virus trashes your computer, it may take weeks for you to recover from the damage. Unfortunately, most people learn this lesson too late.

Help Is On The Way

Fortunately, there is much you can do to keep your computer in its fragile state of equilibrium. You can prevent most computer disasters with the proper use of certain disaster prevention tools (software and hardware) and safe computing practices. You can also take steps to prepare for the occasional, inevitable, unavoidable computer disaster so that you can recover quickly, easily, and completely.

If I've scared the heck out of you, I'm only half sorry because I want you to be aware that you are always computing on the edge of disaster. I promise to make it up to you in future columns with practical, easy-to-follow advice on how to prevent most computer calamities and how to recover from the occasional unavoidable disaster. ■

BY ALAN LUBER

Alan Luber is an author and computer expert. His new book, "PC Fear Factor: The Ultimate PC Disaster Prevention Guide" (Que Publishing), provides an in-depth look at disaster prevention and recovery. To learn more about the book or to contact Alan, visit his Web site at <http://www.pcfearfactor.com>.

Crashing? Try Cooling

Combat Heat Before It's Too Late

SOME OF THE WORST PC PROBLEMS are neither seen nor heard. They are smelled, as in the whiff of burning plastic, molten metal, or sizzling silicon that unfortunate users get from a component that has overheated. Heat is the enemy of every component inside a PC's case, which is why most computers come equipped with vents, fans, and other technology designed to pump cool outside air in and warm inside air out.

Computer users need to be proactive about helping their PCs keep their cool,

and an entire industry has crystallized around the problem, offering a multitude of cooling accessories. The first step, however, is determining whether the PC has a heat problem.

Too Hot To Handle?

It's unfortunate that software and hardware bugs that have nothing to do with temperature can cause many of the signs that indicate a heat buildup might be getting ready to cause a critical failure. When a CPU,

video card, or memory stick gets too hot, sometimes error messages are generated, sometimes programs freeze up, and occasionally the entire computer locks up or spontaneously shuts down.

To see if a problematic program or piece of hardware is the source of the trouble, try to remember the exact steps that preceded the error, reboot the computer, and follow the same steps exactly to see if the same error is triggered. If it is, that's fortunate, because a software or hardware conflict likely is to blame, and it is then possible to contact the manufacturer to see if a patch file or other fix is available.

Most often, overheating problems are a function of time. Components gradually heat up once the computer is booted, and they build up additional heat as they are accessed. An ailing component may work perfectly for several minutes and then suddenly fail once it reaches the critical temperature.

CPUs. With processors, this temperature is reached more rapidly when CPU-intensive operations are performed, such as multimedia editing or spreadsheet crunching. There usually are no visual signs that the processor is about to overheat; it simply generates an error message or shuts down the computer once it has had enough. Heat-related memory errors work much the same way.

Video cards. Video cards are a little easier to deal with because the symptoms of overheating are easier to detect. Static that looks like white, random sparkles on the screen usually is a good sign that the video card is about to go critical. Video cards also tend to heat up quickly when they are used to run graphics-intensive 3D games and applications, as those programs put constant and maximum stress on every portion of the card. If the video card seems to have heat problems, download a 3D benchmarking program such as the free version of Futuremark's 3DMark03 (<http://www.futuremark.com>) and run the tests. If the card is overheating,



it will tend to do so at approximately the same point in the testing each time.

Monitor your motherboard. If you want to get a more accurate assessment of the temperature of your various components, download the free Motherboard Monitor utility at <http://mbm.livewiredev.com>. This powerful tool monitors all aspects of the PC's performance, including temperatures for any devices that are equipped with temperature sensors. It may not have all the information you need because it relies on sensor chips installed on the motherboard, but it's worth a try.

Keep Cool

Heat buildup is preventable, but the amount of work it takes depends entirely on the layout of the computer case and the equipment installed inside. There are many techniques and accessories designed to lower the temperature of a PC, but the cheapest and easiest by far is to rearrange the

internal cables to improve the airflow throughout the case.

Clean up cables. Loads of messy cables lurk inside a PC's case. A fountain of multicolored cables spills out of the



The popularity of overclocking has caused manufacturers to come up with increasingly more efficient ways to cool CPUs, such as this elaborate unit from Active Cool that combines a heatsink/fan with a high-tech thermoelectric cooling unit.

power supply, with individual cables terminating at various spots on the motherboard and thicker clumps sending juice to peripherals like hard drives and optical drives. More cables come out of these devices, with thin cables going to the sound card and long, flat, wide cables connecting the drives to the motherboard (and possibly to each other). Unless the PC came from a company that took the time and expense to route the cords around the case to keep them out of the way, there is a chance that many of them sit squarely in the middle of the path air takes when traveling through the case, causing the overall internal temperature to rise.

It's best to route the internal cords so they are out of the way of vents and fans, using twist ties or other fasteners whenever possible to keep cords grouped or even secured to the sides of the case. If you move cords or cables, be sure to first detach them from the motherboard or other component to reduce the risk of damaging fragile plugs and connectors. Plug everything back in when you finish and double-check to ensure that no other cords were unseated during the process.

To keep things really nice and neat inside the case, consider replacing the flat, wide IDE (Integrated Drive Electronics) cables that connect hard drives and optical drives to the motherboard with rounded cables. These specially designed cables are flat only on the ends, where they plug into the motherboard and drive, but quickly taper into a small drive. This improves airflow throughout the case and makes it easier to maneuver when working with PC components.

Upgrade your fans. Upgrading the fans inside a PC is one of the cheapest and easiest ways to improve cooling efficiency, and with today's quieter fans, it is possible to make the PC less noisy in the process.

A variety of fan sizes are available, ranging from 60mm to a whopping 120mm (most case fans that come with standard PCs are 80mm). It is a common misconception that big fans are louder than small fans; in reality, RPM speed usually determines the overall volume more than any other factor. Small fans tend to spin at higher speeds than large fans and are therefore generally louder.

Some people go nuts and install knobs or switches that let them individually control all the fans in the computer, but that isn't necessary for the majority of users. Just choose a fan that is the same size as the fan it replaces, has a high CFM (cubic feet per minute) value so it moves a lot of air, and has a low decibel (dB) rating so it is quiet. Never install a fan upside down, because if it is attached the wrong way, it can prevent cool air from coming in or hot air from blowing out or force hot air back toward a component.

If heat from the video card is a problem, it's usually possible to use a special fan that sits in an empty PCI slot and improves circulation around the card (or any other component mounted next to it).

Add heatsinks and spreaders. Most components that generate a lot of heat have a block or sheet of metal attached that is designed to draw heat away

Notebooks: Smaller, Thinner, Hotter

Heat is a big problem for notebook computers, which squeeze powerful (and hot) miniaturized hardware into an impossibly small space. Because the edges of most notebooks are narrow and studded with expansion ports and slots, there usually is very little room left for exhaust ports, meaning they are most often located on the bottom of the computer.

This is fine as long as there is adequate space for air to flow out of the bottom of the case and away from the notebook, but using a notebook on carpet or other soft surfaces can create a situation where hot air gets trapped inside the computer and components become overheated. Always use a notebook computer on a flat, hard surface. ■

from the component and disperse it into the case, where fans can suck the excess heat of the machine. Copper, aluminum, and other metals that are relatively light and have good heat conducting properties are used for maximum efficiency.

Heatsinks are blocks of metal that are most often associated with CPUs and usually have a small fan attached to help whisk away heat. The heatsink has many fins to increase the surface area and help it do its job. When purchasing a new heatsink, contact the computer manufacturer to make sure the new heatsink is compatible with the processor installed in the PC and uses the same mounting system as the old one.

Heat spreaders are thin pieces of metal attached to memory sticks that distribute heat evenly over the memory stick and that help the memory stick shed heat. Memory sticks can be purchased with the heat spreaders attached, but separate heat spreaders, and even specially designed heatsink kits designed to attach to memory sticks, are available.

Use thermal tape and paste. Anyone who's looked into installing a CPU heatsink has probably seen recommendations to purchase some thermal paste (also called "thermal compound" or "thermal grease") or thermal tape. This isn't just a good way to squeeze a few extra bucks out of an unsuspecting customer; if you install a CPU without using some, there will definitely be heat problems.

Looking at the metal portion of a CPU and the flat side of a heatsink (which makes contact with the CPU to transfer heat away), both appear smooth. But as far as heat is concerned, those two surfaces are as jagged as the Rocky Mountains, and only a fraction of the surface area of one actually makes contact with the surface of the other when they are pressed together.

Thermal paste and thermal tape are made of special conductive compounds designed to rapidly and efficiently transfer heat. They create a better seal between the CPU and the heatsink. Use thermal paste (instead of tape)

Cooling Accessory Stores

Many of the products mentioned in this article are not available at your local computer store, but there are several recommended manufacturers of PC cooling products you can visit online. Here are a few of the most popular ones:

Active Cool

<http://www.activecool.com>

Cooler Master

<http://www.coolermaster.com>

ThermalTake

<http://www.thermaltake.com>

Vantec

<http://www.vantecusa.com>

whenever possible, because it makes it easier to replace or readjust the heatsink if something goes wrong. Thermal tape doesn't seem sticky at first but turns into glue once it heats up, making heatsink removal a chore.

Add a hard drive cooler. It doesn't happen often, but hard drives sometimes suffer heat-related failures. It is important to keep the area around a hard drive free of obstructions so that air can circulate freely, and many manufacturers sell special hard drive fans and coolers designed to draw heat away from the drive. Many of these devices fit around the hard drive or attach directly to it, so be very careful when installing them and make sure not to drop the drive. (Hard drives contain mechanical parts so fragile that even a slight drop can render a drive useless.)

Try liquid cooling. If you want to take cooling to an entirely different level, several liquid cooling solutions are available. These use pipes or tubes to pump water or other fluids through a heatsink, dramatically increasing its efficiency. Some use other extreme techniques, such as active refrigeration, as well.

Who needs anything like this? Overclockers. Overclocking is a technique

that raises the speed rating of a CPU, video card, or RAM bank to higher than its factory-rated speed. Doing so produces much more heat, and that's where the chilling effects of liquid cooling come into play.

Keep it clean. If a stuffy case is the main problem, why not punch a few extra holes in it or even take the idea to its logical conclusion and run the PC without a case at all? Some power users have done just that, but we don't recommend it because it exposes fragile internal components to dust, pet hair, and other gunk. Those who run caseless PCs also run the risk of accidentally spilling liquid inside the computer or having heavy items drop on the PC's innards, but the dust alone is bad enough. It gums up moving parts, infiltrates metal and plastic connectors, and gets blown into the power supply, where it can cause trouble.

It is possible to put a specialty filter behind the air intake holes, but doing so can seriously reduce the amount of air that flows into the case. The best thing to do is keep the inside of the computer clean using a can of compressed air to blow out all accumulated particles once every month or so (or more frequently if you have pets or the computer is in a particularly dusty spot).

Increase Airflow & Avoid Liquids

Never use water, rubbing alcohol, or any other liquid to clean computer parts, and be especially careful to not touch metal contacts or leads because oils on your fingers can corrode the metal and cause the connection to fail. If something must be wiped off a component, use only a lint-free cloth. Cotton swabs, paper towels, and similar cleaning products leave behind traces of cotton and paper that are detrimental to the PC. With proper airflow and a little TLC, your computer should be able to keep its cool for many years. ■

BY TRACY BAKER

Examining Errors

Startup errors are a pain to troubleshoot because many of them appear to be harmless after you close the error message box, but the messages are back again each time the computer reboots.

Many of these errors don't even have the decency to announce what program caused them, so pinpointing the source of the trouble is tough. This month we looked at several common startup errors along with an equally annoying Microsoft Excel problem.



The Problem: Each time the reader boots her Windows XP computer, an Unhandled Exception error message box appears. The computer works normally after rebooting, but the message always comes back.

Error Message: "Unhandled Exception: c0000005 at Address: 10016b8."

A program called Delfin Media Viewer usually causes this particular unhandled-exception error. If you don't remember installing that application, that's probably because you use the popular Kazaa file-sharing software, which installs Delfin Media Viewer by default (along with a slew of other applications and spyware that you probably don't want on your computer).

If you want to keep Kazaa but get rid of the error message, click Start, click Control Panel, open Add Or Remove Programs, and scroll down the list until you find the entry for Delfin Media Viewer. Click the entry

to highlight it and then click the Change/Remove button and follow the prompts to uninstall the software. You can use the same procedure to uninstall Kazaa itself from your system, which we recommend. Use a similar application, such as KazaaLite (<http://www.kazaalite.com>), that doesn't install spyware or adware.

Other spyware applications that reside on your computer can also cause this error, so we recommend running an up-to-date spyware detection and removal program, such as Lavasoft's free Ad-aware (<http://www.lavasoftusa.com>), to get rid of such unwanted programs and files.

The Problem: Each time a reader boots her Windows 98SE machine, an error message appears saying no ISDN (Integrated Services Digital Network) devices were found, even though the reader doesn't use ISDN. When she closes the error box, the computer runs normally, but the message never goes away permanently.

Error Message: "No ISDN devices were found. Please install an ISDN device and run the configuration wizard again."

Despite the hundreds of reports we read while researching this message, Microsoft has no information at all regarding a solution. The only way many users were able to make the error message go away was by reformatting their hard drives and completely reinstalling Windows. This is an annoying error message, but you may be better off ignoring it until Microsoft acknowledges its existence. If you don't want to ignore it, we found a couple of fixes that might work.

ISDN was a fairly popular and relatively fast alternative to dial-up modems before very fast broadband connections, such as cable modems and DSL (Digital Subscriber Line), hit the scene. Very few people use ISDN these days, but if you're one of them and you receive this error message, there are a few potential causes.

One cause may be the w3/Magistr @MM (Magister) virus; it sometimes makes a copy of the ISDN Configuration Wizard file (Cfgwiz32.exe), infects the copy, and adds the name of that file to the Windows startup routine so it launches automatically when Windows boots. It is unlikely that the Magister virus caused this particular error message because it changes the name of the file it copies slightly; however, it never hurts to run an antivirus program when you get startup error messages like this one. Be sure your antivirus definition files are up to date.

There's a slim chance that the real Cfgwiz32.exe program is set to launch each time Windows boots, so click Start, click Run, and type msconfig.exe in the box before clicking OK. Choose the Startup tab and look for a Cfgwiz32.exe entry or any other entry that looks like it may be ISDN-related. Remove the check mark from any such entry by clicking the checkbox, click Apply, and click OK.

The Problem: When a Windows Me user boots her computer, an error appears that doesn't seem to affect the computer's operation when she closes the message.

Error Message: "Localization String Not Found."

A localization string is a line of computer code that generates text, a date, or other information depending on the language or location selected when a program is installed. This error message doesn't come up often, and many times, moving a mouse from one port to another (for example, from a PS2 port to a USB [Universal Serial Bus] port or vice

versa using an adapter) seems to cause this error. If you've recently connected your mouse to a different port, try moving it back to see if that solves the problem. Also, visit the mouse manufacturer's Web site to see if there's an updated driver available for your OS (operating system) and download and install the driver according to the instructions.

The Problem: When a reader attempts to open certain Microsoft Excel files using Excel 2000, an error message pops up and the files refuse to load.

Error Message: "This workbook contains a type of macro (Microsoft Excel version 4.0 macro) that cannot be disabled or signed. Therefore, this workbook cannot be opened under High Security Level."

This is a dilemma, because it isn't a good idea to lower the security level for fear of opening up Excel to potential macro viruses. Fortunately, this is a known problem with both Excel 2000 and Excel 2002; it's triggered when a user of either of those spreadsheets attempts to open a file containing an Excel 4.0 macro (or macros). To fix it, you'll have to edit the Windows Registry, and you probably already know that making the wrong changes to your Registry can make your OS unbootable. Make a backup of your Registry before tweaking it in any way.

Use System Restore to create a Restore Point if you use Windows Me/XP and create a fresh Windows Startup disk if you use Win98. Put a blank floppy diskette in the A: drive,



click Start, expand Settings, click Control Panel, and double-click Add/Remove Programs. Select the Startup Disk tab and click the Create Disk button. Follow the prompts to create the Startup Disk.

To create a back up of your Registry in Win98/Me, click Start, click Run, type scanregw.exe in the text box, and click OK. Click Yes when the dialog box asks if you want to create a Registry backup and click OK when the backup completes.

In WinXP, you must use the included Backup utility to make a copy of the Registry. Click Start, expand All Programs, expand Accessories, expand System Tools, and click Backup. Click the Advanced Mode link and select the Backup tab. Open the Job menu, click New, and click the box next to the

There's one other potential cause of this error: A stray program in the Windows startup routine is probably set to launch automatically. Click Start, click Run, type msconfig.exe, and click OK. Select the Startup tab and look for entries that appear to be related to a program or a piece of hardware you may have recently installed or removed from your system (about the time the error message started cropping up). Remove the check marks from the checkboxes next to any suspicious-looking entries, click Apply, click OK, and reboot your computer to see if it has any effect.

System State entry in the list on the left. Use the Backup Media text box to type the path and folder where you want to store the backup or click the Browse button to navigate to the folder. Click Start Backup, enter a description if you want to, and click Start Backup. Click Close when the backup completes.

Now click Start, click Run, type regedit.exe, and click OK. Expand the HKEY_LOCAL_MACHINE\SOFTWARE\MICROSOFT\OFFICE\10.0\EXCEL entry; look for 9.0 if you use Excel 2000. Click the Excel folder to highlight it, click the Edit menu, expand New, and click Key. In the New Key #1 field, type Security, press ENTER, open the Edit menu, expand New, and click DWORD Value. Replace the name of the value with the letters XLM and press ENTER. Double-click the new XLM entry to open it and type the number 1 in the Value Data box. Click OK and exit the Registry Editor.

Now when you load the files using Excel, a warning box will still appear, but you can click Enable Macros to open them.

Have questions about an error message you've seen? Send us your message (errormessages@smartcomputing.com) and we'll try to decipher it. Tell us what version of Windows you're using, give the full text of the error message, and provide as many details in your explanation as possible. Volume prohibits individual replies.

Quick Fixes

Microsoft Write Converter

Similar to our fix of the month, this utility translates Windows Write (version 3.0 and 3.1) documents into a format that Word 97 can read and vice versa. To download this program, type the URL (uniform resource locator) below, and from the Product/Technology drop-down menu, select Word. Sift through the search results and click the link named Converter For Microsoft Windows Write. After you download the 193KB file, close Word and double-click the downloaded file (named Write32.exe). Don't use this utility until you've read its instructions on the download page. ♦

<http://www.microsoft.com/downloads>

Pinnacle Systems Studio 8

This update will correct a few problems with Pinnacle Systems Studio 8. The patch will repair corrupt project problems caused when you cut and paste custom titles, and it will also fix bugs related to nested menus linked to incorrectly working still images. To download this update, type the URL below, click Support, and in the Home Video box, click the link for Studio Version 8. Scroll to the Updates/Patches/Utilities section and click Software Updates. Look for the section called What's New In Studio 8.5.21. Click the Studio8_5_21.exe link and click Download to begin transferring the 6.88MB file. After you complete the download, double-click the file named Studio8_5_21.exe to install the patch. ♦

<http://www.pinnaclesys.com>

SmartDraw 6

Download this update for SmartDraw 6 to help the program work more smoothly with SmartDraw Photo and add the ability to move full clip art galleries into SmartDraw Photo. To download this update, type the URL below, and in the SmartDraw section, click the link titled Download The Update To Version 6.11. After you finish downloading the 3.43MB file, double-click the file called Smartdraw_patch_611.exe to install the fixes. ♦

<http://www.smartdraw.com/support/updates.htm>

Road Atlas Travel Software Update

This 1.67MB patch will fix mismatched atlas page grids and let you use your printed version of the Rand McNally 2003 Road Atlas with the program. To download this file, type the URL below, scroll to the very bottom of the page, and click Downloads. Scroll all the way to the bottom of the page again. From the Select A Product drop-down menu, select Road Atlas Travel Software and click Go. Click Download Now, and after your computer completes the download, double-click the file named RAServicePack.exe to install the patch. ♦

<http://www.randmcnally.com>

Add-On Symbols For DeLorme Programs

DeLorme recently released a number of add-on icons you can use in several of the company's applications, including 3D TopoQuads, the Street Atlas series, XMap Series, and

Topo USA products. To download these new icons, type the URL below and click Downloads on the left side of the page. Click the link for Street Atlas USA 2003 and then click the link titled Additional Symbols For DeLorme Software (Article ID DEL00399). Click the Download Now link beneath the symbol set you want and be sure to save the file in C:\DELORME\DOCS\SYMBOLS directory. ♦

<http://www.delorme.com/support>

Fix Of The Month

WordStar Converter

Sometimes it's nearly impossible to retrieve documents you typed on a computer 10 years ago because contemporary software is so different from old programs. If you used WordStar for MS-DOS (versions 3.3 to 7) or WordStar for Windows (versions 1.0 to 2.0), you can use this utility to convert those documents to Word 97 format or change Word 97 files into a format that will work with WordStar 4.0 or 7.0 for MS-DOS. To download the utility, type the URL (uniform resource locator) below, and from the Product/Technology drop-down menu, select Office. Click Go, and from the Sort Results By menu, select Date and click Go. Scroll through the search results and click the Converter For WordStar link. Click Download to save the 271KB file to your PC. After you download the file, close Word and double-click the file Wrdstr32.exe to install the utility. Be sure to read the utility's instructions on the download page. ♦

<http://www.microsoft.com/downloads>



Unwired...

Unplugged, uncompromised, uncomplicated. There are lots of words to describe the unparallelled 802.11b Cable/DSL Wireless Router (MR814) from NETGEAR®.

Unplugged for convenience. The MR814 offers just what you need for unhampered access and connections. You'll get a router, switch and access point all in one solution. We also offer an optional USB notebook adapter card.

Uncompromised for security. Concerned about hackers? The MR814's NAT firewall makes data unavailable to all but your users. Internet activities are secure with content and URL filtering. Plus, you'll get a free, one-year subscription of Freedom® Personal Firewall software for up to eight connected PCs.

Uncomplicated for easy set-up. The MR814 was designed for home/small office use, featuring plug-and-play installation with our Smart Wizard. You'll be up and running in minutes - unlike with other wireless solutions.

Unparalleled for support and style. Take advantage of this award-winning solution that conforms to industry standards and is backed by 24x7 toll-free support. A solution enclosed in a sleek, smartly designed, space-saving case. Available at a price that makes the MR814 an uncommon value. For details, visit www.netgear.com. And get unwired.



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Q & A

Get straight answers to your technical questions from *Smart Computing*. Send your questions, along with a phone and/or fax number, so we can call you if necessary, to: *Smart Computing* Q&A, P.O. Box 85380, Lincoln, NE 68501, or email us at q&a@smartcomputing.com. Please include all version numbers for the software about which you're inquiring, operating system information, and any relevant information about your system. (Volume prohibits individual replies.)

Need help with your hardware or software?
Looking for simple explanations on technical subjects?
Send us your questions!



Windows

Q: I've recently networked two home computers, and everything seems to work fine; however, I have a nuisance problem. Whenever I turn on my main computer, a Micron running Windows 98SE, a window comes up asking for my name and password. I can click OK or Cancel, and the window goes away; then my computer finishes its opening routine. How can I get rid of this nuisance?

A: The solution we're proposing assumes you have nothing in the password field (no password or space characters). If this is not the case, you won't be able to dismiss the network logon screen. Before you delete your password, you may want to give the idea some sober second thought, first: Are you comfortable knowing that anyone in or visiting your house will be able to gain access to your system at any time, simply by starting it up and proceeding?

Your nuisance problem is easy to fix. Right-click Network Neighborhood and select Properties from the context menu (as an alternative, open Control Panel and click the Network applet). In the Network Properties dialog box, glance down to Primary Network Logon field and click the down-arrow button. From the drop-down list, choose Windows Logon. Click OK. At this point, Windows needs to rebuild your network drivers, and it may ask for the Win98SE CD, or it may be able to find the correct drivers on your hard drive. Either way, you'll be asked to restart the system for the change to take effect. After rebooting, that nuisance should go away.



Hardware

Q: We have a Gateway PC, with an Intel 200MHz Pentium processor, that we bought in June 1997. Originally running Windows 95, we upgraded to Windows 98, upgraded the memory to 128MB, and upgraded to a 17-inch

monitor. It works adequately. We use it only for sending email, accessing the Internet, and writing letters. My wife and I are semiretired. We got our grandsons several computer games (Road Racing and a Coaster Deluxe) and tried to play them on the PC. However, an error message said the computer couldn't play the games. To play the games, do we need a newer, more powerful computer or can we upgrade our computer?

A: Congratulate yourselves on getting the most out of your computer. With the hectic pace of computer technology, a 6-year-old computer is often considered a dinosaur. Although your PC obviously satisfies most of your needs, it is a bit underpowered for running recent games.

According to the system requirements for Ultimate Ride Coaster Deluxe, your system is missing two key components: a 333MHz processor and a 3D graphics card. NASCAR Road Racing has an even stiffer processor requirement, 400MHz. As you mentioned, you're faced with two options: upgrade your system or replace it.

Upgrading your current system is not an option that we'd recommend, for several reasons. If you wanted to upgrade to a faster processor, you'd have to replace your motherboard. Today's processors won't work in your Gateway system, nor will a modern 3D graphics card. In addition to the motherboard, you'd need to replace the power supply. The cost of these components (not to mention the labor involved) would easily exceed \$350, and you'd have a hodge-podge of components.

Replacing your computer with a speedier model will let you play more modern games with ease. You should be able to find a Pentium 4, 1.8GHz system for roughly \$500 from an online vendor such as Dell (<http://www.dell.com>). Another option is to keep your old computer and buy a game console such as Microsoft's Xbox, Nintendo's GameCube, or Sony's PlayStation 2. Game consoles are designed with longevity in mind, and you should be able to buy any of these systems for less than

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\$200. Unfortunately, you won't be able to use the PC games you've bought with any of these consoles. However, renting console games is commonplace in many cities.

Q: I have a Toshiba Tecra 8100 notebook with 8X DVD-ROM that I just bought used. DVDs work perfectly, but my MS Works 99 CD-ROM draws no response at all. There's an initial spin, with nothing on-screen, and then the drive shuts down. I tested the disc in a desktop system, and it works fine. Can you help?

A: Despite the best intentions of computer hardware manufacturers, incompatibilities often crop up at the most inconvenient times. Ostensibly, the DVD-ROM drive in your Toshiba should be able to read most CD-ROMs with no difficulty, but as your predicament illustrates, this isn't always true.

Fortunately, there's usually a simple cure for this type of problem. Because you can read the disc in a second computer, you can be reasonably confident that the data on the disc is readable. To completely eliminate the DVD-ROM as the source of your trouble, see if it can read a different CD-ROM. If it can, the most likely culprit is some type of residue on the disc. DVD-ROM drives can be prone to misreading discs that are not in pristine condition. Because regular DVDs play properly, the drive itself doesn't need to be cleaned. This leaves us with cleaning the Works CD-ROM.

To clean the CD, you'll want to buy a cleaning device similar to the Fellowes (<http://www.fellowes.com>) Radial CD Cleaner. You can also use the cleaner for DVDs: It'll do a good job of cleaning discs without damaging the disc surface. The cleaners typically cost \$12 and include a cleaning solution that helps remove dust and dirt from your discs.

If your Toshiba fails to read a different CD-ROM, you may need to clean the laser lens on the DVD drive. You can find lens cleaners (and CD cleaners) at most electronic stores for approximately \$12. These devices clean the small window the drive's laser shines through. If none of these remedies works, you may have to buy an external CD-ROM drive.

Q: I'm using a Dell Dimension 400 with Windows 98SE and want to buy a USB (Universal Serial Bus) hub to increase the number of ports available; I now have only two on the rear of the computer. However, I'm confused by the different products on the market and don't want to fall into the trap of buying something only to see it out of date in a few months. Some hubs have power adapters and some do not. I'm aware of the advantages of the new USB 2.0 high-speed standard, but should I be looking at FireWire instead?

A: Adding a USB hub is a great way to expand the number of peripherals you may add to your computer. You've touched on some of the more important criteria to look for in a hub. There are two types of USB: USB 1.1 and USB 2.0. USB 1.1 operates at approximately 12Mbps (megabits per second), and USB 2.0 devices can operate as fast as 480Mbps.

In addition, you can use USB 1.1 peripherals with USB 2.0 devices, but not vice versa. The older peripherals won't gain any speed, but at least you won't need to replace them. Unfortunately, Win98SE doesn't support USB 2.0. You may be able to find a hub vendor that ships a custom USB 2.0 driver for Win98SE, but you'd probably be better off upgrading your OS (operating system) to either Windows 2000 or Windows XP.

As you mentioned, some USB hubs are unpowered, while others supply power to the USB devices. If your budget can accommodate the added cost, we recommend buying powered hubs. Otherwise, you may find that you may not be able to use a peripheral if its power requirements exceed what the hub can provide.

Also, don't confuse FireWire devices with USB devices. Although similar in many ways, the two technologies are not interchangeable. FireWire devices (sometimes referred to as iLink or IEEE 1394) have transfer speeds ranging from 400Mbps to 800Mbps. The FireWire interface is often used for connecting digital camcorders to PCs, as well as some external hard drives and scanners. If you have a device that requires a FireWire port, you can buy add-on cards that let you connect FireWire devices to your PC. These cards typically cost between \$30 and \$50, depending on the number of ports.

Currently, USB 2.0 and FireWire are battling each other for the peripheral connector market, but in our opinion, there's plenty of room for both technologies. If we had to make a recommendation between the two, it would be USB 2.0 simply because of the greater number of PC peripherals available.

Q: I've been trying to establish a network between a Dell running Windows XP and an old Packard Bell running Windows 95 using a Category 5 crossover cable. Both computers recognize the cable connection, but I cannot access any files. I've read all the articles from your Web site on networking but haven't seen anything specifically addressing networking between WinXP and Win95. The disk that the Network Wizard in WinXP prepared for networking doesn't work with Win95. I remember having read somewhere that you cannot establish a network between WinXP and Win95 using the RJ-45 connectors. Am I spinning my wheels or is there something I'm overlooking?

A: As far as we've been able to determine, the RJ-45 connector isn't the issue. We suspect that the

short answer to your question lies in the NIC (network interface card). It's possible one (or both) system is failing to provide onboard collision detection. Try upgrading one or both NICs to see if that corrects the problem; you might want to borrow a hub and a pair of straight-through cables from a friend to see if that's the issue, first. The explanation of collision and why you should use a hub are a little hairy, but we think it makes sense. Early Ethernet standards, dubbed IEEE 802.3, were for types of connections that let computers be daisy chained (a set of hardware components connected to each other in a series; the first component connects to the computer, the second component connects to the first, and so on). In this case, the chain starts with the first computer in the network and proceeds to the next in line and to the next one after that until the last one is reached. This form of network was also known as 10Base-2 and sometimes as ThinNet). The cabling, 50 ohm coaxial cable with special connectors, was quite expensive and the maximum distance one computer could be from another was 185 meters. But there was no central hub (or switch). In this environment, it's essential to be able to detect collisions (when two or more computers on the network want to use the same channel at the same time, resulting in a garbled or lost message).

The 802.3 standard evolved to include a less expensive (and therefore more popular) type of Ethernet network structure, known as 10Base-T (or 10/100Base-T). This type of network uses pairs of wires, twisted together (and is also known as Twisted Pair Ethernet); can span as far as 100 meters between components; and uses less expensive, plastic RJ-45 connectors similar to, but larger than, standard plastic RJ-11 telephone jacks. Systems were no longer chained together in one long line. Instead, they were connected through a central device known as a hub (or switch; there isn't room in this answer to go into the distinction between hubs and switches). The hub/switch became responsible for collision detection. As a cost-saving measure, it's possible that the NICs in your systems don't have the circuitry required to perform independent collision detection.

When you're connecting just two computers together in a 10Base-T network (or 10/100Base-T network with a faster upper limit speed), you can use a hub, but it's far more common to use a crossover cable instead. A crossover cable is a standard Ethernet cable that has one of its pairs of wires crossed at one of the connectors, so that the two computers receive signals indicating that there is a hub in place. However, because there really is no hub (or switch), the NICs are responsible for the collision detection that would otherwise have been the responsibility of the hub/switch. Note that as soon as you add a third computer to the network, you must use a hub or switch to connect all three.

Using a crossover cable is convenient and, of course, is also less expensive than buying a hub, but there's a small problem. Crossover cables aren't officially supported under the 802.3 standard. Microsoft acknowledges that many people use crossover cables but still recommends that you don't use these cables when troubleshooting network problems; instead, Microsoft suggests that you use a pair of straight-through cables and a hub.



Online

Q: I have a new computer with WinXP Pro installed. Xupiter software was

installed on my computer somehow, and I don't know how. I didn't bother with it because it didn't seem to be doing any harm. Then, all of a sudden, I couldn't use Internet Explorer. I restored my system to a time before this software was loaded. It seems to be OK now. My question is: Where did I get Xupiter software? Is my computer OK now, or am I going to have problems in the future?

A: Xupiter is a browser plug-in that's the latest in a long line of Internet-Most-Unwanted programs that annoy and exasperate experienced and novices computer users alike. Xupiter's creators claim it can't install itself, but there are numerous reports of users saying they did not agree to install the program. Xupiter elicits such a strong reaction because of its invasive nature. For the unwary Web surfer, Xupiter can prove a stubborn foe.

Technically, Xupiter is an ActiveX control that is usually downloaded from the Internet. Depending on the security settings of your browser, you may not even notice it automatically installing itself. By default, Internet Explorer's security settings let Xupiter install itself. You may have been infected when you visited a Web site or by a pop-up add; however, most antivirus software won't protect against programs such as Xupiter because they aren't really viruses.

Here's how you can tell if you're suffering from a Xupiter infestation: Your browser's home page resets itself to <http://www.xupiter.com>, Web sites have been unknowingly added to your Favorites folder, and a Xupiter toolbar was added to your browser. Xupiter will also display pop-up or pop-under ads as you surf the Web.

One of the more irritating things about Xupiter is its ability to protect itself. If you try to remove it through the Windows Add/Remove Programs utility, you won't find an entry. If you try the brute force method of deleting the Xupiter folder, it will reinstall itself the next time you restart your computer. Because you're using WinXP, using the System Restore utility is one way to remove Xupiter successfully. The only downside is that you'll have to reinstall any applications or updates you've made since your last restore.

If you're using an older version of Windows, remove Xupiter by downloading and running the Standard version of Lavasoft's (<http://www.lavasoftusa.com>) Ad-aware. The free version is available for noncommercial use and quickly removes Xupiter and other spyware programs. Ad-aware Standard edition can't prevent these programs from infesting your PC; it can only remove them. If you can't afford to buy the Plus or Professional version, you can still minimize your risks.

Another valuable tool is Spybot Search & Destroy from PepiMK Software (<http://spybot.safer-networking.de>). This free program removes Xupiter, as well as other malicious software programs. With either product, install the latest updates, so that new forms of Xupiter (and other spyware programs) don't slip through your defenses.

If you're unsuccessful removing Xupiter with either of these tools, you can remove Xupiter by manually stripping out the program. A word of caution: this procedure entails modifying your system's Registry, and a mistake could seriously damage your computer. Always back up your Registry before making any changes to it.

Open your Registry: click Start, Run, and type regedit. Next locate these keys:

HKEY_CURRENT_USER\Software\

Delete the Xupiter value.

HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Run

Again, delete the Xupiter entry.

HKEY_LOCAL_MACHINE\Software\Microsoft\Search

Find the SearchAssistant value, right-click SearchAssistant, select Modify, and type the URL (uniform resource locator) for your original homepage.

HKEY_LOCAL_MACHINE\Software\Microsoft\Main

Find the SearchBar value. Right-click SearchBar, select Modify from the context menu, and, again, type the URL for your original homepage.

HKEY_LOCAL_MACHINE\Software\Microsoft\Internet Explorer\Main

Find the Start Page value, right-click it, select Modify from the context menu, and type the URL for your original homepage. Close the Registry. Next, delete the Xupiter folder under C:\PROGRAM FILES (although this depends on where you've installed your OS, you may find your Program Files on your C: drive). Double-click My Computer, double-click the drive on which your files reside, and double-click Program Files) and restart your computer. Find the Xupiter folder, select it, and press DELETE. Or you can right-click the folder and select Delete from the context menu.

Many readers have encountered the changing nature of Xupiter. Xupiter appears to be periodically modified to

avoid detection. Although using a current copy of the tools we mentioned can help, beefing up IE's security settings is the best way to avoid Xupiter. To change these, launch IE, click Tools, and click Internet Options. Click the Security tab and highlight Internet. Click Custom Level and make sure the following options are configured:

Download Signed ActiveX Controls.....	Prompt
Download Unsigned ActiveXControls.....	Disable
Initialize And Script ActiveX Controls	
Not Marked As Safe.....	Disable
Run ActiveX Controls And Plug-Ins	Prompt
Script ActiveX Controls Marked Safe	
For Scripting	Prompt

Click OK after making the necessary changes and click Yes when IE asks you if you're sure you want to change the security settings. These settings minimize your risk of getting Xupiter or a similar program, while letting you use the majority of safe ActiveX controls used on the Internet.

Finally, don't be fooled into using the Xupiter uninstall utility at Xupiter's homepage. It doesn't remove Xupiter, and we've seen reports where the uninstall utility actually caused additional problems. Use the tools and techniques we've outlined, and you should be safe.

Q: I have a new PC with a 1.8GHz Pentium 4 CPU, running WinXP. When I surf the Web using IE, animated GIFs (Graphics Interchange Format) don't animate. They work fine when they show up in my email. I've tried Mozilla and Netscape browsers with the same result.

A: Most Web surfers love or hate animated GIFs, and this ambivalence has led browser developers to include the option to disable or enable them. You may not be able to view animated GIFs because image animation is disabled in your browser. Most email clients don't have a similar preference setting, which would explain why the animated GIFs function when you receive an email in HTML (Hypertext Markup Language) format.

To make the modifications to Internet Explorer, launch IE and then click Tools, Internet Options, and the Advanced tab. Scroll down to the Multimedia section and put a check in the Play Animations In Web Pages box.

To make the same modifications to Mozilla (or Netscape), launch Mozilla and click Edit and Preferences. In the Preferences dialog box, scroll down to Privacy & Security and select Images. In the section called Animated Images Should Loop, check As Many Times As The Image Specifies. Click OK to apply this change and Mozilla should display the animated GIFs as the Web site's designer intended. These steps are identical for Netscape 6 and greater. If you're using a version of Netscape prior to Netscape 6, this option isn't available.

FAQ

Frequently Asked Questions

*Answers to users' most common questions about
Windows XP Media Center Edition*

FAQ: What is Windows XP Media Center Edition? WinXP Media Center Edition (let's shorten it to MCE from here on out) is an OS (operating system; software that controls a computer and its peripherals) specifically designed to work in Media Center PCs. Microsoft calls MCE a superset of WinXP Professional Edition, which means that it's a special enhancement to that OS. MCE provides a single, simplified interface that lets you manage your music files, video files, and digital photographs; play DVDs; and watch and record TV programs either by sitting in front of your PC using a keyboard and mouse or via remote control from almost anywhere in the room. The MCE interface uses large type so it's easily visible from afar.

MCE supports time-shifting, a capability found in VCRs and PVRs (personal video recorders), such as ReplayTV and TiVo, that lets you record a TV program to the PC's hard drive and watch it at a later time. MCE includes a picture-in-picture feature so you can watch two programs at once (or watch television in a small window while you work at your PC), and it lets you pause live television. It also works as a jukebox for all your music files and can show your digital photos as a slideshow complete with transition effects and background music. One limitation is that MCE doesn't currently work with HDTV (high-definition television), but if MCE is successful, it seems likely that future releases would support HDTV input.

FAQ: What is a Media Center PC?

Media Center PC is the official brand name for a computer that (1) meets Microsoft's requirements for running MCE, and (2) is made by a manufacturer that has a partnership with Microsoft to make Media Center PCs. Media Center PCs must meet the system requirements for running WinXP Pro and must also include an MCE-compatible remote control and infrared receiver, a high-performance video card (and, if the

video card doesn't include it, a TV tuner and ports for TV output), a hardware encoder for recording TV programs to the hard drive, and digital audio output so you can play audio through PC speakers or a home entertainment system. Media Center PCs typically include a DVD drive capable of burning multimedia files to DVD+R/RWs (DVD plus recordable/rewritable) or DVD-R/RWs (DVD dash R/RWs).

FAQ: What companies make Media Center PCs, and how much do they cost?

Presently, 10 companies manufacture Media Center PCs. The systems range in price from Northgate Innovations' \$840 model (this includes minimum system requirements and no monitor) to Alienware's Navigator Extreme, which has a base price of \$2,899 and includes high-performance components but no monitor. Gateway's Media Center PC is a good example of a total package system; it includes a 17-inch flat-panel monitor and costs \$1,699.

FAQ: Is the Media Center PC a major innovation or just hype?

The answer lies somewhere in between these two extremes. Although the components and software for assembling a system comparable to a Media Center PC have existed for years, Microsoft's MCE is the first major software release designed to bundle a complete array of multimedia functions (photos, music, television, and DVD) in a simple-to-use OS. Additionally, Media Center PCs are the industry's first stab at mass-producing systems with broad multimedia capabilities.

FAQ: Can I upgrade from WinXP Home or Professional Edition to MCE?

No, MCE is currently not available as an upgrade to WinXP or any other OS. Microsoft designed MCE so that OEMs (original equipment manufacturers), such as Gateway and Hewlett-Packard, could include the OS in their Media Center PCs. MCE includes all of WinXP Pro's functionality.



Broken Computers, Broken Promises

ACTION EDITOR

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My wife recently bought a Dell notebook for \$920. The computer was working fine until fewer than 30 days later, she left the PC in her car during a cold night. When she brought the PC into the house and opened it, there was a crack in the screen. I called Dell's technical support line and explained what happened. The representative assured me that the warranty covered the damage and the company would repair it free. Airborne Express picked up the PC, and five days later, Dell called to tell us the damage wasn't covered and it would cost \$968 to repair. We refused to pay for the repairs, so Dell sent the cracked PC back. Can you convince Dell to back up its promise to fix the computer?

Chris Tankelewicz
Philadelphia, Pa.

On Feb. 25, we emailed Dell explaining Chris' PC problem. The next day, Dell called saying that a response team would look into the warranty matter. We didn't hear back, so on March 13, we emailed Dell again. This time we received an immediate response saying the company had been trying to contact Chris and his wife. Four days later, a Dell representative emailed us to say Dell had determined that the computer originally shipped with a cracked display, and thus, the warranty covered it. On March 19, Chris' wife received a brand-new notebook PC.

I bought a Sony PCVRZ14 PC on Oct. 3, 2002, and I've experienced nothing but frustration with this product. The computer died in December, and the company replaced the power supply. Sony returned the PC in about a week. One week later, the PC died again. A Sony representative told me that there was a recall on the entire RZ line, so I sent it back, and this time, the computer wasn't returned for almost two weeks. Sony sent me a CLIE PDA (personal digital assistant) as an apology, but before long, my PC started to malfunction once again. When I called to complain, I

was put on hold with no response whatsoever, and my email messages to the tech support site accomplished nothing. When I finally reached someone via phone, the representative rejected my request to speak to a supervisor. Can you help?

Bill Stevens
Simi Valley, Calif.

We emailed Elizabeth Mousourakis at Sony on March 14 to see if she could help with Bill's flawed computer. Mousourakis replied on the same day. On March 18, we received a call from a Sony representative who said the problem was resolved and that Sony was sending a replacement PC to Bill. Bill emailed us on March 19 to say that he received his new PC and that it was a more expensive model than the original.

In February, I installed Norton SystemWorks 2003 on my computer, on which I'd previously installed Norton Internet Security, a program that uses Symantec's LiveUpdate procedure to update the computer with current virus definitions. I spoke to a customer service representative who assured me that my subscription for updates would last until February 2004; however, my program indicates I only have 81 days left before I have to resubscribe. Plus, when I try to update my definitions, nothing happens, and when I email technical support, it does nothing but copy and paste the same unhelpful answers into each reply. Is there something you can do?

Mary Frohock
East Chicago, Ind.

We emailed Symantec's public relations department with Mary's complaint. Four days later, Mary let us know her problem had been fixed. Mary says a representative helped her adjust a few Windows settings and reinstall the programs, a process that let her PC run the LiveUpdates procedure smoothly.

Sounding Board

Each month, we give voices in and around the computing world a chance to sound off on topics that matter to everyday users.



"Over the course of 25 years of the desktop, there have been many attempts to deliver competing desktop platforms. With today's maturity of the key elements of desktop operating systems based on open source, open protocols, and open file formats, many companies are working to deliver compelling Linux-based desktops for both home and business users. Sun is focusing our efforts on delivering an end-to-end enterprise solution that delivers office productivity, communications, calendaring, Web access, integrated Java technology support, and desktop manageability that will enable enterprises to deploy a solution that addresses both total-cost-of-acquisition and total-cost-of-ownership challenges."

—Curtis Sasaki, vice president of Desktop Solutions, Sun Microsystems



"It has already started. In contrast to the Microsoft movement, which went from the desktop to the server, Linux is moving from the server to the desktop, bringing all the inherent server qualities with it, like security, stability, and availability. This is about businesses and governments that want to expand the successes they have had with Linux on the server. There are tremendous opportunities for businesses with many distributed clients to build a robust, cost-efficient, stable working environment for their users. And with the ability for Microsoft Office 'power users' to run their favorite applications on Linux, the barriers to adoption are falling rapidly."

—Holger Dyroff, general manager, Americas, SuSE Linux

Q: Linux is growing in popularity, with distributions such as Red Hat, Mandrake, and SuSE becoming attractive options, especially for running servers. Now, Windows is attempting to bring Linux to the desktop in a form attractive to nongeek end users. When, if ever, will some form of Linux become a viable competitor to Microsoft for domination of home and business desktops?



"I think Linux has a long way to go before they'll be a viable competitor to Microsoft's home and business desktop market. Microsoft has a great product in Windows XP Home and Professional editions and people perceive it as easy to use, stable, and a good choice for both the business and the home, which it is. Linux is perceived by most to be more complicated, difficult to install, and difficult to use, and not a great option for the average end user. Whether or not any of this is true doesn't matter. The majority of people think upgrading and using Microsoft's technology will be easier for them than installing and learning Linux."

—Joli Ballew, network consultant, writer ("Windows XP Professional - The Ultimate User's Guide"), and technology trainer



"Linux is not ready for the average user's desktop because the majority of software vendors are not in the habit of producing Linux versions of their software. Linux does not yet have a reliable GUI with the ease of use and interoperability now found in Windows. It has taken Microsoft 10 years to build a GUI with this functionality, which sits on top of a stable operating system. Even if Linux built a comparable Windows GUI, it would take 10 years to work out the reliability and stability issues? Linux for the average end-user is still sometime in the future."

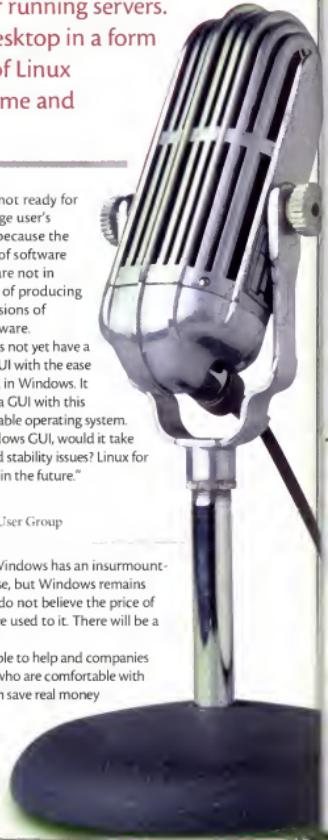
—Linda Moore, program director and president elect of North Texas PC User Group



"Predicting the future is difficult at best. Keeping that in mind, I believe that Windows has an insurmountable lead in the consumer market. Linux has made great headway in ease of use, but Windows remains easier. Although the Linux operating system is cheaper (in some cases, free), I do not believe the price of Windows will drive consumers away. Windows has its flaws, but consumers are used to it. There will be a great reluctance to try something new."

The business world could be a different story. With system administrators available to help and companies looking to save money, Linux could well make headway on the desktop. People who are comfortable with Windows will resist the change. But companies with thousands of computers can save real money with Linux. The Linux operating system could be very successful in business."

—Kim Komando, talk radio host and syndicated columnist





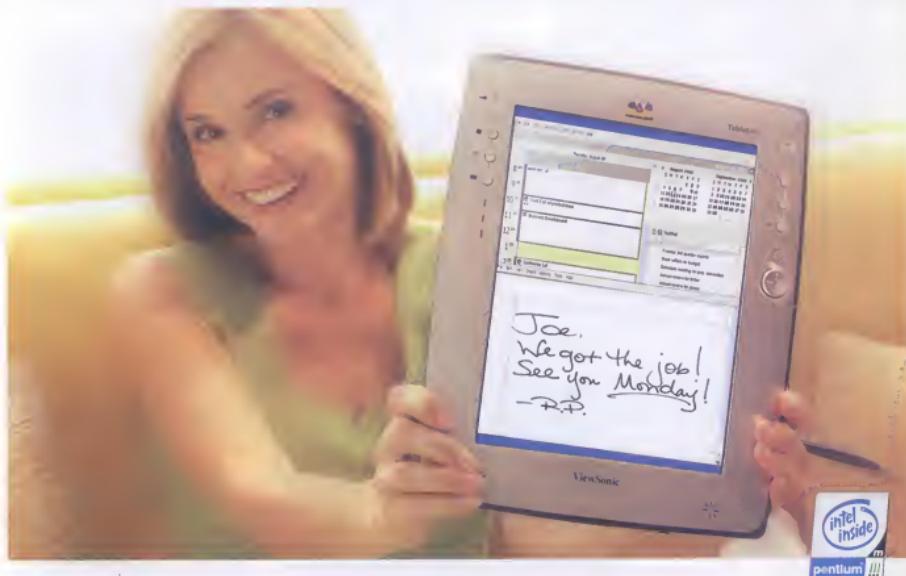
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